

**Draft Environmental Impact Statement
Draft General Management Plan**

September 2001



WALNUT CANYON

National Monument • Arizona

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SUMMARY:

This general management plan will guide the management of Walnut Canyon National Monument for the next 10 to 15 years. Three alternatives were considered - a no-action and two action alternatives, including the National Park Service preferred alternative. The preferred alternative would preserve untrailed expanses, unfragmented natural systems, and relatively pristine conditions throughout much of the park. It would protect Walnut Canyon as a critical wildlife corridor. Visitation would be managed with the goal of providing quality learning opportunities in an intimate atmosphere while maintaining the health of the canyon ecosystem. The natural soundscape and tranquil setting of the canyon would be enhanced through strategic placement of facilities. The park would remain day-use only, with recreational uses of the western end prohibited. Efforts would be made to provide a broader range of educational offerings, and a greater number of archeological sites would be available for visitation. The environmental impact statement assesses impacts to archeological resources; historic character of built environment; ethnographic resources; natural systems and processes; threatened, endangered, and sensitive species; wetlands, floodplains and riparian resources; visitor experience of park resources; park neighbors; local, state, and tribal land management plans; land/resource managing agencies; and operational efficiency.

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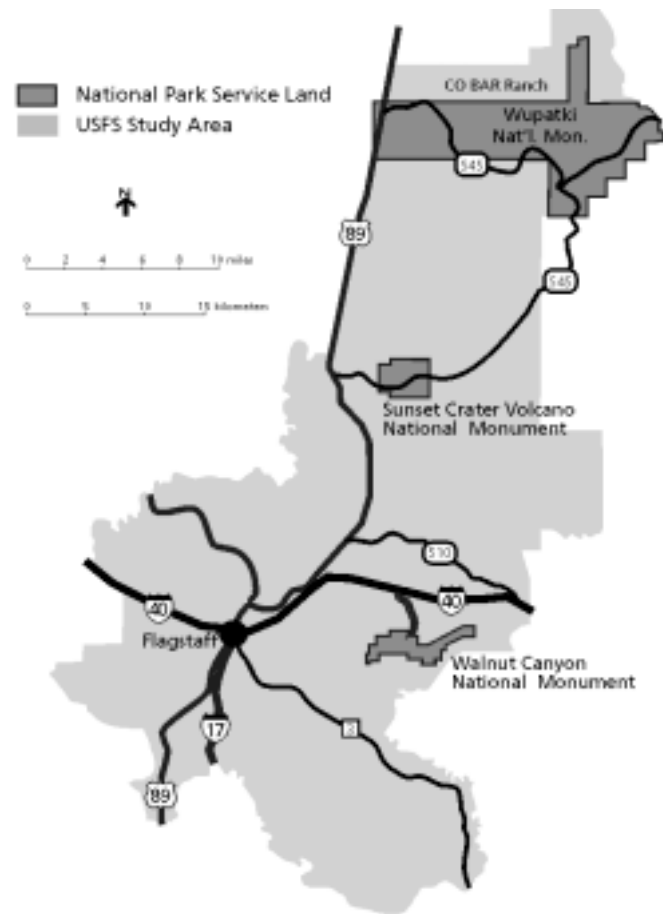
PURPOSE OF AND NEED FOR THE PLAN

PURPOSE OF THE GMP

The purpose of the general management plan (GMP) is to clearly define a direction for resource preservation and visitor use at Walnut Canyon National Monument (NM). It is the intent of this planning effort to provide a comprehensive direction for the next 10 to 15 years and to arrive at that direction through public participation. In fact this draft GMP is the result of extensive interaction with interested publics and affected government agencies begun in June 1996 (see Description of Scoping Process and Consultation and Coordination sections).

The approved plan will provide a framework for proactive decision making, including decisions on visitor use, natural and cultural resources management, and park development, which will allow park managers to effectively address future opportunities and problems. The general management plan will prescribe the resource conditions and visitor experiences that are to be achieved and maintained in the park over time. The clarification of what must be achieved according to law and policy is based on review of the park's purpose, significance, special mandates, and the body of laws and policies directing park management. Management decisions to be made where law, policy, or regulations do not provide clear guidance or limits will be based on the purpose of the monument, the range of public expectations and concerns, resource analysis, an evaluation of the natural, cultural, and social impacts of alternative courses of action, and consideration of long-term economic costs.

Some of those conditions and experiences are specified already in law and policy, whereas others are open to debate and



Combined USDA - USFS Flagstaff/Lake Mary Ecosystems Analysis and DOI - NPS Flagstaff Area National Monuments General Management Plan Study Area

must be determined through planning. Based on determinations of desired conditions, the plan will outline the kinds of resource management activities, visitor activities, and development that would be appropriate in the monument in the future. However, the plan will not propose specific actions or describe how particular programs or projects will be implemented or prioritized. Those decisions will be deferred to more detailed implementation planning, which will follow the broad, comprehensive decision making outlined in the general management plan.

NEED FOR THE GMP

There were many issues and concerns that precipitated the need for a GMP.

Administratively, the three parks of the Flagstaff Area (Wupatki, Sunset Crater Volcano, and Walnut Canyon National Monuments) were combined under one superintendent in 1990. A boundary expansion of Walnut Canyon (approximately 1,333 acres) was added as part of the 1996 National Park Service (NPS) Omnibus Bill. Visitation has increased demands on park resources, resulting in documented loss of some resources through erosion, vandalism, erosion and theft.

Nationwide demographics and traffic patterns (Sunbelt migration, international visitors, aging of America, shorter vacations year-round) have increased peak visitation seasons and extended shoulder seasons. Flagstaff growth and housing development is occurring near park boundaries, impacting the visitor experience and remote character of the monument and increasing incompatible adjacent land uses. Traffic levels are increasing adjacent to and through the park; views are intruded on by mining operations, housing developments, and divided highways; and noise is increasing.

The development of Walnut Canyon created a use pattern that funnels all visitors to one place on the canyon rim. The parking area and part of the visitor center, built by the Civilian Conservation Corps (CCC), are inadequate for today's vehicles and visitation levels. Crowded conditions exist at times. No orientation material is available at the park entrance near I-40. The entrance station is three miles south, near the visitor center, and the park is gated and closed at night at this location.

The visitor center has always had accessibility issues, which have been temporarily remedied but require a long-

term solution. Visitor center exhibits date to the 1960s. Interpretive media are outdated or inaccurate, and there is no consistent integrated message between this and the other two Flagstaff area parks. The park is a popular location for school outings, but there is no group facility, auditorium, or place to gather people indoors, and groups often exceed the capacity of facilities.

Park boundaries are poorly marked. The monument was expanded in 1996 (by the Omnibus Parks and Land Management Act) by transferring approximately 1,333 acres from U.S. Forest Service to NPS jurisdiction. The lands have not been surveyed or fenced, and there is some confusion on the part of public users regarding where USFS lands end and the monument begins. The new lands on the west side of the monument are within two miles of residential areas of the city of Flagstaff, and parts of the western boundary of the monument coincide with the corporate boundary of the city of Flagstaff. Forest resources include ponderosa pine, pinyon pine, and juniper, which attract woodcutters seeking personal firewood. Antelope, elk, and deer attract hunters and wildlife viewers. The Coconino National Forest administers several grazing permits for local ranchers in the lands adjacent to the monument. Local citizens have traditionally and currently used the surrounding forest areas for recreational activities, including horseback riding, recreational vehicle uses, hiking, camping, hunting, birding, woodcutting, shooting, and mountain biking. A section of the Arizona Trail passes the northwest corner of the monument and is used by local and regional visitors for recreational purposes. Because of this proximity, occasional inappropriate uses occur on monument property, including trespass, shooting, hunting, woodcutting, and vehicle travel.

Three state trust sections of land adjacent to, or within two miles of, the monument could be offered for sale and development. Development could pose external threats in the form of increased unauthorized uses, trespass by animals, noise, and degradation of the viewshed.

Approximately 291 acres of private land exist inside the eastern boundary of the monument, and there is potential for development by the owner. Development of this private property could result in water impoundment behind a historic dam to create a lake that could possibly back up onto monument land. There is the potential for residential development and increased exposure of park cultural resources to trespass and inappropriate uses, resulting from residential development and the attraction of a lake.

The canyon has significant biological diversity and concentrations of threatened and endangered species. Affiliated tribes have identified traditional cultural properties within park boundaries and have concerns about public visitation to archeological sites.

In 1998, the staff of the Flagstaff Area monuments (Wupatki, Sunset Crater Volcano, and Walnut Canyon National Monuments) undertook an in-depth review and analysis of staffing needs for the three monuments and for support positions in headquarters. This process identified critical positions in visitor services, protection, resource management, maintenance, and administration that are integral to accomplishing the purposes of the monuments and the National Park Service mission. This review evaluated existing conditions and personnel shortfalls in terms of National Park Service abilities to provide for a safe, educational visitor experience and for adequate protection and preservation of park resources. A number of positions were identified as critical to maintaining operations at

acceptable levels, for both current and future needs. These needs were identified prior to the general management planning process and are incorporated into the alternatives developed.

Reaffirm What Must Be Achieved

Each unit in the National Park System is guided by agency-wide and park-specific laws, regulations, and policies. Understanding this guidance and how it affects each park's mission is fundamental to planning for the park's future. This section highlights the mission (expressed as park purpose, significance, and mission goals) and legal and policy mandates that guide management of the park. These mission and mandate statements define the sideboards within which all management actions must fall. All alternatives to be considered in the general management planning effort must be consistent with and contribute to fulfilling these missions and mandates.

PARK MISSION

Walnut Canyon National Monument was established by Presidential Proclamation No. 1318 on November 30, 1915, to preserve the prehistoric ruins of ancient cliff dwellings. The monument was enlarged by Presidential Proclamation No. 2300 on September 24, 1938, and on November 12, 1996, by P.L. 104-333. On February 28, 1965, Public Land Order 1269 by the Bureau of Land Management withdrew public lands as material source sites and added lands to construct a monument approach road. The monument occupies approximately 3,600 acres immediately adjacent to Coconino National Forest and to the city limits of Flagstaff, Arizona.

The park purpose for Walnut Canyon is:

- To protect ancient cliff dwellings and associated resources that are of great ethnographic, scientific, and

PURPOSE AND NEED

educational interest and to properly care for and manage the cultural and natural resources of historic, social, and scientific interest within Walnut Canyon National Monument.

The park significance for Walnut Canyon is:

- Concentrations of ancestral Puebloan habitations are found in Walnut Canyon's "island" topography-the distribution, diversity, and location of sites are unusual and include the only cliff dwelling architecture of the Northern Sinagua culture. Walnut Canyon and Walnut Creek provide vivid evidence of the Sinaguas' ability to procure sufficient water to sustain life and grow crops.
- The natural and cultural resources within the monument are known to be significant to contemporary native tribes, as evidenced by oral history, continuing practices, and the archeological record.
- Within Walnut Canyon, ecological communities overlap to form ecotones, bringing together species usually separated by elevation, and creating a rare compression of flora/fauna zones. The biodiversity supported by these habitats includes a high concentration of sensitive species and is thought to have contributed to the decision of prehistoric people to settle here.
- Topographic relief and biotic diversity make the canyon an outstanding scenic resource. Together with adjacent forest lands, the monument serves as a significant component of a designated greenbelt and natural sanctuary surrounding the city of Flagstaff.
- Historic railroad settlements, such as Flagstaff, contributed to Walnut Canyon becoming one of the first archeological areas to be heavily visited. Some sites record the extensive looting of the period. Today, owing to

management that emphasizes preservation, Walnut Canyon National Monument provides scientific opportunities to study irreplaceable cultural and natural resources.

MISSION GOALS

Mission goals were developed for the three units in the Flagstaff Area National Monuments Strategic Plan (NPS 2000). They state that:

- Natural and cultural resources and associated values within the three Flagstaff Area monuments are protected and maintained in good condition and managed within their broader ecosystem and cultural contexts.
- Flagstaff Area National Monuments actively pursue acquisition of natural and cultural resource data through NPS staff and funding channels and through association with the scientific community. Current and complete scientific findings are available for communication to partners, integration into the interpretive program and use in the management decision process.
- Facilities, services, and recreational opportunities offered are in keeping with site-specific requirements of resource protection and visitor enjoyment. Safety measures are an integral part of the visitor experience.
- Through on-site and off-site education, the Flagstaff Area National Monuments promote visitor understanding of park purpose and significance, enhance appreciation and enjoyment, and promote an attitude of personal responsibility.
- Flagstaff Area National Monuments use current management practices, systems, and technologies to accomplish their missions.
- The Flagstaff Area National Monuments increase their capabilities

through initiatives and support from other agencies, organizations, and individuals.

SPECIAL MANDATES AND ADMINISTRATIVE COMMITMENTS

The monument has numerous special use agreements with other agencies:

Law Enforcement Agreements between USFS and NPS: National, regional, and local agreements exist that allow law enforcement operations on each other's lands.

Memorandum of Understanding with Coconino County Sheriff's Department: Outlines areas of responsibility within the national monument and provides for the deputization of NPS protection park rangers through the Coconino County Sheriff's department.

Interpretive Partnership: This partnership, which has been in operation for seven years, coordinates interpretive activities on NPS and USFS lands and encourages consistent messages through shared staffing.

Cooperative Agreement with Department of Anthropology, Northern Arizona University: Provides assistance to NPS for various cultural resource management activities, using NAU students and faculty to complete projects.

Memorandum of Understanding with Museum of Northern Arizona: Allows the museum to store and care for various artifacts from the three Flagstaff Area monuments, while retaining NPS ownership of the collection.

Cooperative Agreement with Southwest Parks and Monument Association (SPMA): Allows SPMA to operate a bookstore in each of the Flagstaff Area monuments and headquarters, with support provided to NPS from those sales.

Billie Wells Special Use Permit: Allows permittee to operate and maintain a

water line across the northwest corner of Walnut Canyon National Monument in connection with grazing operations. The water line runs across the monument just inside the northwest corner, then follows FS303, on the north side, to water storage tanks on the ranch north of the monument.

SERVICEWIDE LAWS AND POLICIES

As with all units of the National Park System, management of Walnut Canyon National Monument is guided by the 1916 act creating the National Park Service, the General Authorities Act of 1970, the act of March 27, 1978, relating to the management of the National Park System, and other applicable federal laws and regulations, such as the Endangered Species Act and the National Historic Preservation Act.

Many resource conditions and some aspects of visitor experience are prescribed by these legal mandates and NPS policies. Although the attainment of some of these conditions has been deferred in the monument because of funding or staffing limitations, NPS will continue to strive to implement these policies at the monument with or without a new GMP. The GMP is not needed to decide, for instance, whether or not it is appropriate to protect endangered species, control exotic species, improve water quality, protect archeological sites, provide access for visitors with disabilities, or conserve artifacts.

The conditions prescribed by laws, regulations, and policies most pertinent to the planning and management of the monument are summarized in this section.

Impairment

Current laws and policies require the analysis of potential effects to determine whether or not actions would impair park resources.

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Desired Condition	Source
<p>While Congress has given the Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.</p> <p>The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.</p>	Management Policies

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse

impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. A determination of impairment is made in the Environmental Consequences section for each impact topic.

Cultural Resource Management Requirements

Archeological Resources

Current laws and policies require that the following conditions be achieved for archeological resources in the park:

Desired Condition	Source
Archeological sites are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; Archeological Resources Protection Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies
Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable.	
In those cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged.	

Portions of the park have not been systematically surveyed or inventoried.

Precise information about the location, characteristics, significance, and condition of the majority of archeological resources in the park is lacking, and impacts are difficult to measure. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to archeological sites:

- Survey and inventory archeological resources and document their significance.
- Treat all archeological resources as eligible for listing on the National Register of Historic Places (NRHP), pending a formal determination by the National Park Service and the Arizona State Historic Preservation Officer (SHPO) as to their significance.
- Protect all archeological resources determined eligible for listing on, or listed on, the NRHP; if disturbance to such resources is unavoidable, conduct formal consultation with ACHP, SHPO, and affiliated American Indian tribes in accordance with the National Historic Preservation Act.

Historic Properties

Current laws and policies require that the following conditions be achieved in the park for historic properties (e.g., buildings, structures, roads, trails, cultural landscapes):

Desired Condition	Source
Historic properties are inventoried and their significance and integrity are evaluated under National Register criteria.	National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of

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Desired Condition	Source
The qualities that contribute to the eligibility for listing or listing of historic properties on the NRHP are protected in accordance with the Secretary of the Interior's Standards (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).	Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies

Many of the historic properties in the park exhibit various stages of deterioration owing to a lack of systematic preservation maintenance. A study of planning and architecture of the NPS Mission 66 program is under way. The study will provide the park with baseline data necessary for the long-term preservation of these resources.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to historic properties:

- Complete a survey, inventory, and evaluation of historic properties under National Register criteria.
- Complete a survey, inventory, and evaluation of cultural landscapes.
- Submit inventory/evaluation results to SHPO with recommendations for eligibility to the National Register.
- Determine the appropriate level of preservation for each historic property formally determined to be eligible for listing, or listed on, the National

Register (subject to the Secretary of the Interior's Standards).

- Implement and maintain the appropriate level of preservation for such properties.
- Analyze the design elements (e.g., materials, colors, shape, massing, scale, architectural details, site details) of historic structures and cultural landscapes in the monument (e.g., buildings, bridges, trails, roads and intersections, curbing, signs, picnic tables) to guide rehabilitation and maintenance of sites and structures.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

Desired Condition	Source
Anticipated impacts to Indian trust resources are addressed in environmental documents.	Secretarial Order 3175; NPS Management Policies

Although there are no Indian trust resources in Walnut Canyon, resources important to Indian tribes were identified during the scoping process by the tribes themselves, and that information was carefully incorporated into the design of alternatives so that these resources would be protected under any alternative considered.

Ethnographic Resources

Certain contemporary American Indian and other communities are permitted by

law, regulation, or policy to pursue customary religious, subsistence, and other cultural uses of park resources with which they are traditionally associated. The National Park Service plans and executes

programs in ways that safeguard cultural and natural resources while reflecting informed concern for the contemporary peoples and cultures traditionally associated with those resources.

Desired Condition	Source
<p>Ethnographic information will be collected through collaborative research that recognizes the sensitive nature of such information.</p> <p>All agencies shall accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of these sacred sites.</p> <p>The National Park Service acknowledges that American Indian tribes, including Native Alaskans, treat specific places containing certain natural and cultural resources as sacred places having established religious meaning and as locales of private ceremonial activities. Consistent with E.O. 13007, the Service will, to the extent practicable, accommodate access to and ceremonial use of Indian sacred sites by religious practitioners from recognized American Indian and Alaska Native tribes, and avoid adversely affecting the physical integrity of such sacred sites.</p> <p>Other federal agencies, state and local governments, potentially affected American Indian and other communities, interest groups, State Historic Preservation Officer, and the Advisory Council on Historic Preservation will be given opportunities to become informed about and comment on anticipated NPS actions at the earliest practicable time.</p> <p>All agencies shall consult with tribal governments prior to taking actions that affect federally recognized tribal governments. These consultations are to be open and candid so that all interested parties may evaluate for themselves the potential impact of relevant proposals. Parks will regularly consult with traditionally associated American Indians regarding planning, management, and operational decisions that affect subsistence activities, sacred materials or places, or other ethnographic resources with which they are historically associated.</p>	<p>NPS Management Policies</p> <p>Executive Order 13007 on American Indian Sacred Sites</p> <p>NPS Management Policies, E.O. 13007 on American Indian Sacred Sites</p> <p>National Historic Preservation Act; Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); Executive Order 11593; American Indian Religious Freedom Act, American Indian Graves Protection and Repatriation Act, Executive Order 13007 on American Indian Sacred Sites; Presidential Memorandum of April 29, 1994, on Government-to-Government Relations with Tribal Governments; NPS Management Policies</p> <p>American Indian Religious Freedom Act; Presidential Memorandum of April 29, 1994, on Government-to-Government Relations with Tribal Governments; NPS Management Policies</p>

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Desired Condition	Source
Certain research data may be withheld from public disclosure to protect sensitive or confidential information about archeological, historic, or other NPS resources when doing so would be consistent with FOIA. In many circumstances, this will allow the NPS to withhold information about ethnographic resources.	NPS Management Policies
American Indians and other individuals and groups linked by ties of kinship or culture to ethnically identifiable human remains will be consulted when remains may be disturbed or are encountered on park lands.	NPS Management Policies; American Indian Grave Protection and Repatriation Act

To accomplish these goals, NPS will do the following:

- Survey and inventory ethnographic resources and document their significance.
- Treat all ethnographic resources as eligible for listing on the National Register of Historic Places, pending a formal determination by NPS and Arizona SHPO as to their significance.
- Protect all ethnographic resources determined eligible for listing or listed on the NRHP; if disturbance to such resources is unavoidable, conduct formal consultation with ACHP and SHPO in accordance with the National Historic Preservation Act.
- Conduct regular consultations with affiliated tribes to continue to improve communications and resolve any problems or misunderstandings that occur.
- Continue to encourage the employment of American Indians on the park staff to improve communications and working relationships and encourage cultural diversity in the workplace.
- Provide for access to and use of natural and cultural resources in parks and collections by American Indians that is consistent with park purposes, does not unreasonably interfere with American

Indian use of traditional areas or sacred resources, and does not result in degradation of park resources. Through consultation, an agreement with tribes on access issues will be developed.

In addition, consultation with affiliated Indian tribes was conducted throughout the course of the planning process. Tribes were funded to identify ethnographic resources within the three Flagstaff Area monuments, and this information was considered in developing alternatives.

Collections

Current laws and policies require that the following conditions be achieved in the park for museum collections:

Desired Condition	Source
All museum objects and manuscripts are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act; American Indian Religious Freedom Act; Archeological and Historic Preservation Act; Archeological Resources Protection Act; American Indian Graves Protection and Repatriation Act; NPS Management Policies

Desired Condition	Source
The qualities that contribute to the significance of collections are protected in accordance with established standards.	

The Flagstaff Area curatorial/museum collections are at risk. Improper storage and lack of adequate security and fire protection systems at facilities that house the collections threaten their safety and integrity. Significant portions of the archeological and historical collections remain uncataloged, and the collections continue to be scattered throughout various facilities.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to collections:

- Construct and staff an approved curatorial facility to house the Flagstaff Area collections.
- Accession and catalog all park museum collections in accordance with standards in the NPS Museum Handbook. All cataloging information will be made accessible in the Automated National Catalog System.
- Ensure objects are housed in proper storage. Ensure that museum collections not housed in NPS repositories are preserved, protected, and documented, according to National Park Service standards.
- Inventory and catalog all park museum collections in accordance with standards in the NPS Museum Handbook.
- Develop a collection management program according to NPS standards to guide protection, conservation, and use of museum objects.

- Implement the collection management program.

Natural Resource Management Requirements

Air Quality

Wupatki is a class II air quality area. Current laws and policies require that the following conditions be achieved in the monument for air quality:

Desired Condition	Source
Air quality in the monuments meets national ambient air quality standards (NAAQS) for specified pollutants.	Clean Air Act; NPS Management Policies
Park activities do not contribute to deterioration in air quality.	Clean Air Act; NPS Management Policies

Overall, the regional air quality is good. Air flows generally down and away from the adjacent San Francisco Peaks and visible pollutants generally do not accumulate within Walnut Canyon. The NPS has very little direct control over air quality within the airshed encompassing the monument. At times, regional haze generated from coal-fired power generating stations affects Flagstaff and Walnut Canyon, which is in the same airshed as Grand Canyon National Park. The NPS cooperates with the Arizona Department of Environmental Quality (ADEQ) and the Environmental Protection Agency to monitor ozone concentrations at Walnut Canyon between April and October every year. Current results show some elevation of ozone levels (ca. 60 ppb) during the summer months prior to the onset of the monsoon season in July. In addition, the NPS remains concerned that seasonal air temperature "inversion" events trap wood-burning stove smoke and other air pollutants near the surface around Flagstaff and locally impairs visibility within Walnut Canyon. The

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severity of these events would be expected to increase as the Flagstaff population increases and the city encroaches upon the monument boundary.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to air quality:

- Participate in regional air pollution control plans and regulations and review of permit applications for major new air pollution sources.
- Augment local air quality monitoring programs by establishing long-term monitoring stations for visibility impairment at Walnut Canyon and continue monitoring ozone at monument. Monitoring will be conducted in conjunction with regional air quality agencies.
- Conduct park operations in compliance with federal, state, and local air quality regulations.

Water Resources

Current laws and policies require that the following conditions be achieved in the monument for water resources:

Desired Condition	Source
The Service will perpetuate surface waters and groundwaters as integral components of park aquatic and terrestrial ecosystems.	Clean Water Act; Executive order 11514; NPS Management Policies
The Service will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks.	Clean Water Act; Executive Order 12088; NPS Management Policies

Desired Condition	Source
Natural floodplain values are preserved or restored.	Executive Order 11988; Rivers and Harbors Act; Clean Water Act; NPS Management Policies
The natural and beneficial values of wetlands are preserved and enhanced.	Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS Management Policies

The watershed and riparian resources of Walnut Canyon are being altered by upstream impoundments at Upper and Lower Lake Mary. The NPS and Department of Justice are currently negotiating a water rights agreement to resolve water rights issues for Walnut Canyon National Monument. A number of entities are involved, including the city of Flagstaff, U.S. Forest Service, and Navajo and Hopi Tribes. It is anticipated that settlements will be reached in the near future.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to water resources:

- Apply best management practices (BMP) to all pollution-generating activities and facilities in the parks, such as NPS maintenance and storage facilities and parking areas; minimize use of pesticides, fertilizers, and other chemicals and manage them in keeping with NPS policy and federal regulations.
- Assess the impacts from the diversion of surface water from the Walnut Canyon watershed by the city of Flagstaff and attempt to mitigate these impacts where feasible.

- Promote greater public understanding of water resource issues and encourage support for mitigating impacts in the Walnut Canyon watershed.

Geologic Resources

Current laws and policies require that the following conditions be achieved in the park for geologic resources:

Desired Condition	Source
Natural soil resources and processes function in as natural condition as possible, except where special management considerations are allowable under policy (areas of special management considerations will be determined through management zoning decisions in the GMP).	Monuments' enabling legislation; NPS Management Policies

Some areas within Walnut Canyon National Monument are receiving heavy visitor use, which is causing local soil compaction, loss of vegetative cover, and erosion. This is particularly evident in steep terrain or improperly designed and maintained trails.

The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to soils:

- Identify areas of Walnut Canyon where current human activities and modern developments are accelerating soil loss and causing erosion problems; take actions appropriate to the management zone to deter resource degradation and restore soil formation processes.

Species of Special Concern

Current laws and policies require that the following conditions be achieved for species of special concern in the park:

Desired Condition	Source
Federal- and state-listed threatened and endangered species and their habitats are sustained.	Endangered Species Act; NPS Management Policies
Populations of native plant and animal species function in as natural a condition as possible except where special management considerations are warranted. (Areas with special management considerations will be determined through management zoning decisions in the GMP.)	Monuments' enabling legislation; NPS Management Policies
The Service will strive to restore extirpated native plant and animal species to parks when specific criteria are met.	Monuments' enabling legislation; NPS Management Policies
Management of populations of exotic plant and animal species, up to and including eradication, will be undertaken wherever such species threaten park resources or public health and when control is prudent and feasible.	NPS Management Policies; Executive Order 13112, Invasive Species

Many natural areas support populations of species that are sensitive to human disturbance and development. If these species are in serious decline, they are protected by law. Preserving the prehistoric landscape of Walnut Canyon may also provide a unique refuge for certain species that are sensitive to other land uses. Development for visitor access, use, and administrative activities within the monument influences plant and animal species distribution. Roads divide the natural areas of the monument and act as barriers or create crossing hazards for wildlife.

Walnut Canyon harbors nesting pairs of Mexican spotted owls, a species that is

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listed as threatened under the Endangered Species Act, and the U.S. Fish and Wildlife Service recently designated critical habitat for the Mexican spotted owl within the monument. The NPS must ensure that management of the monument does not adversely impact this species nor degrade its habitat. Several other unique and rare animal and plant species also inhabit the monument.

Certain species may be subject to collection for cultural reasons, and better information on them is needed to ensure that populations remain stable.

Roads, trails, and disturbed areas function as corridors for invasive species to move into the monument. A few species of nonnative, invasive plants have become established throughout Walnut Canyon. Given time, aggressive "exotic" plant populations can greatly expand, altering natural vegetation, displacing rarer native plants, eliminating native forage and cover for animals, and changing the original scenic character. These effects are already apparent in some areas of the monument and are expected to worsen substantially if left unmanaged. A sustained effort is needed to control these threats to native vegetation and wildlife habitats.

The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to native species and to manage the park "in as natural a condition as possible":

- Inventory and catalog the plants and animals occurring in the monument.
- Regularly monitor the distribution and status of selected species that are (1) indicators of healthy ecosystem function and inherent biodiversity, (2) rare or protected, (3) nonnative, and (4) native species capable of creating resource problems (e.g., overpopulation may result in undue competition or alter available habitat for other species).

- Nurture research that contributes relevant knowledge for conserving native species and ecosystem processes.
- Restore species populations and their habitats where feasible; in particular, protect and restore natural riparian habitat in Walnut Canyon.
- Manage native species in management zones designated for historic scene, active recreation, operations, or other prescribed uses; plantings of nonnative species in such zones would follow NPS policies (e.g., limited use of noninvasive plants only where justified by historic scene or operational needs).
- Control or eliminate nonnative invasive plants and animals where there is a reasonable expectation of success and sustainability; control efforts would be prioritized in order of:
 - threat to legally protected or uncommon native species and habitats
 - threat to visitor health or safety
 - threat to scenic and aesthetic quality
 - threat to common native species and habitats
- Manage diseases and pests in similar priority order to those listed above for nonnative species.
- Educate visitors and neighbors on threats to native species and ways to conserve these species.
- Cooperate with U. S. Fish and Wildlife Department and the U.S. Forest Service to implement the Mexican Spotted Owl Recovery Plan.

Wildland Fire

Current laws and policies require that the following conditions be achieved regarding wildland fire in the park:

Desired Condition	Source
Park fire management programs are designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised. All wildland fires are effectively managed through application of the appropriate strategic and tactical management options.	NPS Management Policies, National Fire Management Plan

The NPS has maintained an active prescribed fire program at Walnut Canyon National Monument since 1990 and will soon prepare a new fire management plan (FMP) and environmental assessment. The plan would identify the appropriate tactics for suppressing wildfires and the objectives for using management-ignited fire. Aggressive suppression tactics are only proposed when human life, property, and adjacent lands are threatened. The NPS has agreements with neighboring fire protection agencies to efficiently share local personnel, equipment, and funds for fire emergency response. In the event a large, regional fire should occur, the monument would participate in an appropriate response as coordinated by the National Interagency Fire Center.

Within the monument, approximately 1,600 acres are dominated by ponderosa pine forest and pinyon-juniper woodland. Pre-settlement forest reconstruction research, fire history, and repeat photography studies reveal that level rim areas surrounding Walnut Canyon used to have fewer but larger ponderosa pines. Local fires used to burn through the forest floor every 5 years or so, thinning tree seedlings and favoring good grass and diverse wildflower cover between the trees. Although the NPS has implemented a limited prescribed fire program to restore these vegetation attributes, the

canyon rim areas remain heavily stocked with young trees and accumulated woody fuels, and may be prone to moderately hot fires. The use of fire is also an accepted practice to manage foraging habitat for Mexican spotted owls and reduce the threat of catastrophic wildfire within designated critical habitat for the species.

The monuments have two agreements with park neighbors regarding fire protection. The Joint Powers Agreement provides for the "nearest available resource" to respond to fire emergencies on each participant's jurisdiction and to recoup costs associated with such actions. The structural fire protection agreement with the city of Flagstaff allows the city fire department to extend fire protection beyond the city limits to include the facilities at Walnut Canyon.

The Park Service will take the following kinds of actions to comply with legal and policy requirements related to fire management:

- Suppress all unwanted wildfires as quickly as possible.
- Use the results from vegetation and fire history studies to establish desired vegetation condition and management-ignited fire objectives; revise the fire management plan accordingly.
- Implement a fire management program with due regard for conserving the Mexican spotted owl and designated critical habitat within the monument.
- Ensure management-ignited fires comply with Arizona Department of Environmental Quality air quality regulations.

Night Sky/Lightscape Management

The monument's night skies are features that contribute to the visitor experience.

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Desired Condition	Source
The Service will preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light. Recognizing the roles that light and dark periods play in natural resource processes and the evolution of species, the Service will protect natural darkness and other components of the natural lightscape in parks. To prevent the loss of dark conditions and of natural night skies, the Service will seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks.	NPS Management Policies

The National Park Service will take the following kinds of actions to comply with this policy:

- Monument staff will work with local communities and other agencies to encourage protection of the night skies.
- Monument staff will evaluate impacts on the night skies caused by facilities within the monument. If light sources within the monument are determined to be affecting night skies, monument staff will study alternatives, such as shielding lights, changing lamp types, or eliminating unnecessary sources.

Natural Soundscapes

An important part of the NPS mission is to preserve or restore the natural soundscapes associated with national

parks. The sounds of nature are among the intrinsic elements that combine to form the environment of our national parks. The natural ambient soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. Natural sounds are slowly and inexorably disappearing from most NPS units.

Desired Condition	Source
<p>The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. The Service will restore degraded soundscapes to the natural condition wherever possible and will protect natural soundscapes from degradation due to noise (undesirable human-caused sound).</p> <p>Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of parks. The frequencies, magnitudes, and durations of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices. The Service will take action to prevent or minimize all noise that, through frequency,</p>	NPS Management Policies

Desired Condition	Source
magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored.	

The Park Service will take the following kinds of actions to comply with this policy:

- Activities causing excessive or unnecessary unnatural sounds in and adjacent to parks, including low-elevation aircraft overflights, will be monitored, and action will be taken to prevent or minimize unnatural sounds that adversely affect park resources or values or visitors' enjoyment of them.
- NPS will work with the Federal Aviation Administration (FAA), tour operators, commercial businesses, and general aviation interests to encourage aircraft to fly outside of the monument, especially for those flights where the presence of the monument is incidental to the purpose of the flight (i.e., transit between two points). Actions that might be considered to encourage pilots to fly outside the monument include identifying the monument on route maps as a noise-sensitive area, educating pilots about the reasons for keeping a distance from the park, and encouraging pilots to fly in compliance with FAA regulations and advisory guidance, in a manner that minimizes noise and other impacts.
- Monument staff will continue to require tour bus companies to comply with regulations that reduce noise levels (e.g., turning off engines when buses are parked).
- Noise generated by NPS management activities will be minimized by strictly

regulating administrative functions such as aircraft use and use of motorized equipment. Noise will be a consideration in the procurement and use of equipment by park staff.

Visitor Experience and Park Use Requirements

Current laws and policies require that the following conditions be achieved in the parks regarding visitor experience and park use:

Desired Condition	Source
Visitor and employee safety and health are protected.	NPS Management Policies
Visitors understand and appreciate park values and resources and have the information necessary to adapt to park environments; visitors have opportunities to enjoy the parks in ways that leave park resources unimpaired for future generations.	NPS Organic Act; Monuments' enabling legislation; NPS Management Policies
Park recreational uses are promoted and regulated, and basic visitor needs are met in keeping with park purposes.	NPS Organic Act; Monuments' enabling legislation; Title 36 of the Code of Federal Regulations; NPS Management Policies
All reasonable efforts will be made to make NPS facilities, programs, and services accessible to and usable by all people, including those with disabilities.	
Americans with Disabilities Act; Architectural Barriers Act; Rehabilitation Act; NPS Management Policies	

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Desired Condition	Source
Visitors who use federal facilities and services for outdoor recreation may be required to pay a greater share of the cost of providing those opportunities than the population as a whole.	NPS Management Policies; 1998 Executive Summary to Congress, Recreational Fee Demonstration Program, Progress Report to Congress, Volume I--Overview and Summary (U.S. Department of the Interior, National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management; U.S. Department of Agriculture, Forest Service)
The park has identified implementation commitments for visitor carrying capacities for all areas of the unit.	1978 National Parks and Recreation Act (P.L. 95-625); NPS Management Policies

These laws, regulations, and policies leave considerable room for judgment regarding the best mix of types and levels of visitor-use activities, programs, and facilities. For this reason, most decisions related to visitor experience and use are addressed in the Decide What Might Be Achieved section and in the alternatives. However, the authority to charge fees is dictated by law and is therefore the same for all alternatives.

The Land and Water Conservation Fund Act (16 USC 4601 et seq.) allows NPS to collect recreation fees of the appropriate type for its parks, facilities, and programs. Fees are to be reasonable and are determined in accordance with the criteria and procedures contained in the Land and Water Conservation Fund Act and regulations in 36 CFR 71. Fees collected under this authority are returned to the

U.S. Treasury. Fees are also being collected for special park uses under 16 U.S.C. 3(a) and 31 U.S.C. 3701, in accordance with OMB Circular A-25. Under this authority, NPS recovers the costs incurred for providing special park uses, but returns to the U.S. Treasury any revenues in excess of costs.

Congress authorized the recreational fee demonstration program to begin on October 1, 1995, and to end on September 30, 2002. The program authorizes NPS and other agencies to implement and test new fees. The program allows the participating agencies to retain all of the demonstration project revenues and to retain at least 80 percent of the revenues at the sites where they are collected. These revenues yield substantial benefits because they provide on-the-ground improvements at local recreation sites. For NPS, the majority of new recreation fee revenues are dedicated to reducing identified backlogged maintenance, infrastructure, and resource management needs. Some of the demonstration fee revenues are reinvested into infrastructure and new collection methodologies to prepare additional areas to collect fees and provide for overall collection efficiency across NPS.

Regulations governing visitor use and behavior in units of the National Park System are contained in Title 36 of the Code of Federal Regulations and Superintendent's Compendium. These regulations have force of law and address a number of use limitations, such as limits on commercial activities.

Under the 1978 National Parks and Recreation Act (P.L. 95-625), NPS is required to address the issue of carrying capacity in its general management plans. The concept of carrying capacity is intended to safeguard the quality of park resources and visitor experiences. Identifying desired resource conditions and visitor experience by zone is part of general management planning. At this

level of decision making, the desired resource conditions and experiences describe carrying capacity in qualitative terms. These qualitative terms are then translated into quantitative standards over time during implementation planning.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to visitor experience and park use:

- Provide opportunities for visitors to understand, appreciate, and enjoy the park (management directions are explored in the alternatives within this broad policy).
- Continue to enforce the regulations in 36 CFR.
- Ensure that all park programs and facilities are accessible to the extent feasible.
- Complete a carrying capacity implementation plan, which will succeed this GMP. This plan will identify indicators and standards, develop a monitoring strategy, and identify management actions needed to address conditions when standards are reached or exceeded.
- Implement a carrying capacity monitoring program.
- Take management action as necessary to keep resource and visitor experience conditions within established standards.

Relations with Park Neighbors and Other Agencies

Walnut Canyon National Monument is managed as part of a greater ecological, social, economic, and cultural system. Current policy requires the following:

Desired Condition	Source
Public participation in planning and decision making will ensure that the Park Service fully	NPS Management Policies

Desired Condition	Source
<p>understands and considers the public's interests in the parks, which are part of their national heritage, cultural traditions, and community surroundings. The Service will actively seek out and consult with existing and potential visitors, neighbors, people with traditional cultural ties to park lands, scientists and scholars, concessioners, cooperating associations, gateway communities, other partners, and government agencies. The Service will work cooperatively with others to improve the condition of parks; to enhance public service; and to integrate parks into sustainable ecological, cultural, and socioeconomic systems.</p> <p>In the spirit of partnership, the Service will also seek opportunities for cooperative management agreements with state or local agencies that will allow for more effective and efficient management of the parks, as authorized by section 802 of the National Parks Omnibus Management Act of 1998 (16 USC 1a-2l).</p>	

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to park neighbors:

- Continue to establish and foster partnerships with public and private organizations to achieve the purposes and mission of the monument. Partnerships will be sought for resource protection, research, education, and visitor enjoyment purposes.

Park staff will keep landowners, land managers, local governments, and the

general public informed about park management activities. Periodic consultations will occur with landowners and communities affected by park visitors and management actions. The National Park Service will work closely with local, state, and federal agencies and tribal governments whose programs affect, or are affected by, activities in the monument. Monument staff will continue their regular consultations with the Arizona State Historic Preservation Office, the Arizona State Game and Fish Department, and Indian tribes. In particular, NPS will maintain a close working relationship with the U.S. Forest Service to meet mutual management needs with staff from the Peaks and Mormon Lake Ranger Districts on the Coconino National Forest. Park staff will continue to meet as needed with staff from Northern Arizona University (NAU) Departments of Anthropology, Geography, Geology, and School of Forestry; Museum of Northern Arizona; U.S. Geological Survey (USGS); USGS Biological Resources Division, Colorado Plateau Field Station, NAU; Coconino Plateau Natural Reserve Lands (CPNRL, formerly Babbitt Ranches); city of Flagstaff; Arizona State Lands Department; Coconino County; Natural Resources Conservation Services; and U.S. Fish and Wildlife Service. Agencies that the monument staff periodically keep informed-depending on the issue-include Grand Canyon Trust, National Parks and Conservation Association, Nature Conservancy, Sierra Club, Friends of Walnut Canyon, and neighboring national parks.

- Monument staff will continue to participate in cooperative regional planning to ensure that the monuments are treated as issues of regional concern.

Sustainable Design/Development

Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques.

Desired Condition	Source
Facilities are integrated into the park landscape and environs with sustainable designs and systems to minimize environmental impact. Development does not compete with or dominate park features, or interfere with natural processes, such as the seasonal migration of wildlife or hydrologic activity associated with wetlands.	NPS Management Policies
Any facility development, whether it be a new building, a renovation, or an adaptive reuse of an existing facility, includes improvements in energy efficiency and reduction in "greenhouse gas" emissions for both the building envelope and the mechanical systems that support the facility. Maximum energy efficiency is achieved using solar thermal and photovoltaic applications, appropriate insulation and glazing strategies, energy-efficient lighting	

Desired Condition	Source
and appliances, and renewable energy technologies. Energy-efficient construction projects are used as an educational opportunity for the visiting public.	

The NPS Guiding Principles of Sustainable Design (1993) directs NPS management philosophy. It provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used in the design and management of tourist facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. Sustainability principles have been developed and are followed for interpretation, natural resources, cultural resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operations. The Park Service also reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources.

In addition to abiding with these principles, the following will also be accomplished:

- Park staff will work with appropriate experts to make the monument's facilities and programs sustainable. Value analysis and value engineering, including life cycle cost analysis, will be performed to examine the energy, environmental, and economic

implications of proposed park developments.

- The park staff will support and encourage suppliers, permittees, and contractors to follow sustainable practices.
- Park interpretive programs will address sustainable park and nonpark practices.

Special Use Management Requirements

Land Protection

One private inholding exists in Walnut Canyon National Monument, a tract of 290.84 acres owned by Warren and Joan Smith of Flagstaff, Arizona. This tract is the site of the Santa Fe dam and reservoir built by the Santa Fe Railroad Company before the turn of the century. Included in the 290.84 acres is a 50-foot strip of land in the canyon bottom that provided access from the main railroad line to the dam and comprises about 14 acres. The private parcel of land has been unused since the monument was established, with the exception of minor repair on a historic dam. The dam is listed on the National Register of Historic Places. Any economic values associated with the tract would be greatly enhanced through the improvement of access and development of a source of water. The current landowner is planning some improvements to facilitate restoring the historic dam and reestablishing a reservoir. These improvements could include a road and water well. With improved access and available water, this tract will have development potential as residential and/or commercial property. Although much of the tract is steep canyon slope or canyon bottom, the rims of the canyon offer acceptable building sites.

A land protection plan prepared for Walnut Canyon in March 1990 identified fee acquisition of the inholding as the preferred method of protection. It found that there are no private uses of the

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inholding that would be compatible with park management objectives (identified in that plan as preservation of the historic scene and natural resource values). The park mission goal applicable to land protection is "Natural and cultural resources and associated values within the three Flagstaff Area monuments are protected and maintained in good condition and managed within their broader ecosystem and cultural contexts." However, until such time as the inholding can be purchased, the National Park Service recognizes that this inholding is private land and respects the rights of this landowner.

Desired Condition	Source
Land protection plans are developed and periodically reviewed and updated for each park containing nonfederal lands or interests that may be subject to acquisition. Land acquisition is guided by a park's land protection plan. The plans identify the alternative methods that will provide for the protection of resources, for visitor use, and for development; identify the minimum interests necessary for those purposes; and establish priorities for acquisition of land or interests in land.	NPS Management Policies; NPS Land Acquisition Policy Implementation Guideline (NPS-25); the Department of the Interior's "Policy for the Federal Portion of the Land and Water Conservation Fund" (FR 47:19784); the NPS "Land Protection Plan Instructions" (FR 48:21121); the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 USC 4601 et seq.); and Executive Order 12630, "Governmental Actions and

Desired Condition	Source
	Interference with Constitutionally Protected Property Rights"

Rights-of-Way and Telecommunication Infrastructure

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition	Source
Park resources or public enjoyment of the parks are not denigrated by nonconforming uses.	Telecommunications Act; 16 USC 5; 16 USC 79; 23 USC 317; 36 CFR 14; NPS Management Policies; Director's Order 53A, Wireless Telecommunications
Telecommunication structures are permitted in the parks to the extent that they do not jeopardize the park's mission and resources.	
No new nonconforming use or rights-of-way will be permitted through the parks without specific statutory authority and approval by the director of the National Park Service or his representative and only if there is no practicable alternative to such use of NPS lands.	

The Telecommunications Act of 1996 directs all federal agencies to assist in the national goal of achieving a seamless telecommunications system throughout the United States by accommodating requests by telecommunication companies

for the use of property, rights-of-way, and easements to the extent allowable under each agency's mission. Unlike with other nonconforming uses, the National Park Service is legally obligated to permit telecommunication infrastructure within the parks if such facilities can be structured to avoid interference with park purposes.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to special uses of park lands:

- Determine appropriate locations and stipulations before permitting telecommunication infrastructure on NPS lands in order to ensure the protection of park resources and quality visitor experiences while endeavoring to respond positively. Applications, sites, and stipulations will be based on the management zoning scheme determined by the GMP.

Description of Scoping Process

NOTICES, NEWSLETTERS, AND MEETINGS

The notice of intent (NOI) to prepare an environmental impact statement was published in the Federal Register May 19, 1997 (62 FR 27272). The NOI indicated availability of the first newsletter, from which comments were accepted until June 30, 1997. The first newsletter (April 1997) described purpose and significance statements for all three Flagstaff Area parks and identified preliminary issues. A mail-back comment form was included, asking the public if they agreed with the material in the newsletter, if they had recommendations on improvement, and if there were issues or problems that had been missed. Comments from the newsletter were collated and presented at an open house August 20, 1997, in Flagstaff. Twenty-nine comment forms were returned by mail. Additional

comments were taken at the open house. Primary issues added by the public included funding, access, and the planning process.

The second newsletter, released in February 1998, detailed public response to the first newsletter, described the final purpose and significance statements, and explained the preliminary range of management zones. Another mail-back comment form was included, which asked the public if the management zones included the experiences they felt were important and if they recommended any changes. Nine responses were received.

A third newsletter, issued in November 1998, combined and organized comments received from newsletters #1 and #2 into decision points and related problems to be solved by alternatives in the draft environmental impact statement. This newsletter also introduced draft alternatives for the three parks and two alternatives proposing a combination of Sunset Crater and Wupatki. Again, a mail-back form was included. This newsletter was followed by another public open house, held in Flagstaff, December 3, 1998, and attended by about 60 people.

The third newsletter and the open house that followed elicited a large response compared with the previous newsletters. One hundred and twenty-eight individual responses were received, along with a petition that had 1,200 signatures and 541 copies of a form letter. The issue generating the petition and form letter was the proposal to expand the boundaries at Sunset Crater and Wupatki and eliminate the use of off-highway vehicles. Other actions proposed in the alternatives (increased access, road closures, and road expansion) received small numbers of responses, relatively equal for and against.

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The fourth newsletter, issued in May 1999, described the decision to prepare a plan concurrently with the Forest Service.

All newsletters were posted on the Internet on the National Park Service planning web page. All comments that were received through June 1999 were considered in this EIS.

A number of meetings were held with staff from the Forest Service and Arizona Game and Fish Department to discuss impacts that the alternatives might have on adjacent recreational activities and impacts to wildlife and their movement corridors and to try to ensure that NPS planning would be in support/harmony with other agencies' planning efforts. Many of the conversations focused on joint or comanagement of resources and visitor uses. A number of meetings were held with the affiliated tribes, including Havasupai Tribe, Hopi Tribe, Hualupai Tribe, Navajo Nation, San Juan Paiute Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Nation, Yavapai-Prescott Tribe, and Zuni Tribe. Meetings with the tribes were held to determine traditional uses, desired continuing uses, ethnography information, sacred sites data, consultation protocol, and issues related to repatriation of human remains and artifacts.

TRIP FACT SHEETS

To determine if existing park visitors' needs were being met, trip fact sheets were set out in each of the three visitor centers. Visitors filled out the sheets voluntarily. The trip fact sheets were a one-page check-off that asked visitors where they were from, why they came to the park, how they preferred to learn about the park, and what they would take advantage of, if it were available. A total of 4,091 trip sheets, spanning a 15-month time frame, were collected and collated.

Responses were fairly consistent for the three monuments. The following five

items were considered highly desirable by visitors to the three monuments:

- Want short and longer hiking trails.
- Want to be able to step off the trail for picture taking.
- Want self-guided activities.
- Want to learn by ranger programs.
- Want to learn by museum exhibits.

VISITOR USE STUDY

As a complement to the public meetings, newsletters, and trip fact sheets, a visitor use study was conducted to gather more in-depth information on visitors, their experience, behavior, and how behavior affects resources.

Approximately 1,200 mail-back questionnaires were distributed in conjunction with an on-site interview. A total of 885 questionnaires were returned—287 for Sunset Crater Volcano, 304 for Walnut Canyon, and 294 for Wupatki. The on-site survey repeated the questions asked in the trip fact sheets, whereas the mail-back questionnaire provided more detailed information. The following information was asked:

- What sites did visitors visit, and how long did they stay at each site?
- In which activities did visitors participate?
- What problems did visitors encounter?
- What were visitors' feelings about seeing other visitors?
- What added to or detracted from their park experience?

Visitors to Walnut Canyon listed seeing archeological ruins, looking at the scenery, and having an adventure as the most important reasons for visiting. The things that bothered visitors included the climb up the stairs, safety concerns, and inconsiderate visitors. When asked about what they would like to see changed, most visitors responded, "nothing." Things that

others did want changed included a trail to the canyon bottom, more trails and guided hikes, a reconstructed dwelling, and changes in the Island Trail, such as more railings, wider trails, a one-way trail, and water on the trail. Other visitors identified desired changes, including some type of "up" transportation and updated and expanded visitor center displays.

Decide What Might Be Achieved

ISSUE ANALYSIS AND CONCERNS

Many issues and concerns were identified by the park staff, other agencies, and the general public as part of the scoping for this general management plan. These issues and concerns were then categorized according to how they could be resolved. The list of things to be addressed in the general management plan will include major planning issues (decision points), the resources and values that could be at stake in choosing one course of action over another (impact topics), and the range of management prescriptions (management zones). These elements are described below. The impact topics are also addressed in the evaluation of alternatives in the Environmental Consequences section of this plan.

DECISION POINTS

Based on public comments and NPS concerns, there are four major points about which decisions must be made in this GMP. The considerations following each statement were actual scoping comments received.

1. We need to decide to what extent we can provide visitor access to cultural and natural resources without unacceptable impacts to those resources.

Considerations:

- Monitoring and protection of resources is difficult.

- Popular resources are trampled by visitors.
- Additional research is needed to understand the relationships between numbers of visitors and resource impacts.
- There is a need to understand tribal requirements for access to and use of resources without disruption by visitor use.
- Trail use often exceeds design capacity, causing safety and resource protection concerns (trails are subject to erosion and rockfalls).

2. Important park goals are to ensure adequate visitor orientation and education and to minimize use impacts. We need to decide whether to accomplish this by increasing facilities and services or by limiting entrance points and visitor circulation.

Considerations:

- Existing buildings do not meet current visitor or employee needs; visitation often exceeds visitor center and parking lot capacities.
- Visitors do not receive necessary information before they encounter sensitive resources.
- Resources are being lost because of vandalism and theft.
- Visitor centers and exhibits do not reflect current scientific thinking or relationships between sites and people.
- Some facilities are located in prime resource areas and may be causing undue impacts on those resources; other facilities are not sustainable or designed for the landscape.
- Existing staffing and budget levels limit visitor services.

3. We need to decide the extent to which park operations, visitor experiences, and resource protection can be integrated across the three

Flagstaff Area parks or whether they need to be treated separately.

Considerations:

- There is redundancy and inefficiency in park facilities and infrastructure; much of the infrastructure is antiquated and inadequate.
- Park units and park operations are not consistently integrated and structured to address prioritized needs.
- Systems and programs do not ensure clear and effective communication among the staff or with visitors.
- Static funding and staffing levels require maximum use and efficiency of park facilities, infrastructure, and programs.

4. We need to determine to what extent we can protect park values through agreements and/or partnerships with park neighbors and inholders and/or boundary adjustments and land acquisition.

Considerations:

- Rapid regional growth and development adjacent to parks increase the potential for damage to resources, viewsheds, and visitor experience.
- Confusion sometimes arises from the presence of multiple agencies with common boundaries and/or resources but different management policies and visitor use regulations.
- There are land management, land trades, and "friendly condemnation" issues near park boundaries involving the state and the U.S. Forest Service.
- Strategies are needed for dealing with private land in the parks while preserving private property rights.

RESOURCES/VALUES AT STAKE IN THE PLANNING PROCESS

During scoping, the resources and values that could potentially be at stake in selecting various future directions for the parks were identified. Public and park staff input was considered. The following impact topics were derived from this scoping input for Walnut Canyon:

- Long-term integrity of archeological resources
Scientific integrity of cultural resources
- Historic character of built environment
Historic resources
Cultural landscapes
- Ethnographic Resources
Long-term scientific and traditional integrity of culturally sensitive areas (shrines, gathering sites, landforms, resource collection areas, etc.)
- Natural Systems and Processes
Conserving native plant and animal communities
Preserving unfragmented habitats
Maintaining natural geomorphic and soil formation processes
Restoring fire-dependent ponderosa pine "park lands" above the canyon rim
Preserving movement corridors and seasonal habitats for wildlife
Protecting plant species diversity and the locally rich assemblage of plant communities
Maintaining naturally functioning drainage systems within the side canyons
Maintaining the integrity of natural systems for ecological research
Excluding nonnative species
- Threatened, Endangered, and Sensitive Species
Protecting federally listed threatened and endangered species, "species of concern," and critical habitats, including the Mexican spotted owl
Conserving other sensitive plants, animals, and unique habitats identified during the scoping process

- **Wetlands, Floodplains, and Riparian Resources**
 - Preserving and restoring riparian vegetation and ephemeral pools along the Walnut Canyon floor
 - Protecting seeps and springs in the side canyons
 - Facility development and recreational impacts to the Walnut Canyon drainage system
 - Facility development and recreational activities in potential flashflood areas
- **Ability to experience park resources**
 - Access to park resources by the general public
 - Access to a full spectrum of park resources for visitors with disabilities
 - Uncrowded visitor experiences
 - Personal freedom (inside and outside park boundaries)
 - Traditional employee/visitor experiences (interpretation through personal services, access to favorite sites)
 - Traditional recreational activities (biking, climbing, etc.)
 - Access to information provided by collections (ability to see the "real thing")
 - Minimally altered environment
 - Ability to experience scenic, recreational, and educational pursuits
 - Visibility of night skies
 - Natural soundscapes, ability to hear natural sounds
 - Ability of public to understand park resources
 - Visitor understanding of regional context
- **Effects on park neighbors; local, state, and tribal land management plans; and land/resource managing agencies**
 - Effects on neighbors' access and emergency response
 - Economic contribution of park to local economies
 - Access to culturally sensitive areas by traditional users
 - Traditional land uses external to boundary

Possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls for the area concerned

- **Operational efficiency**
 - Employee and visitor health and safety
 - Ability to enforce park regulations and protect park values
 - Staff
 - Facilities
 - Distance to work
 - Management of collections and other resources
 - Ease of communication
 - Utilities
 - Employee housing

TOPICS DISMISSED FROM FURTHER ANALYSIS

Socially or Economically Disadvantaged Populations

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. None of the alternatives considered would result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population or community. The impacts on the natural and physical environment that occur from any of the alternatives would not significantly and adversely affect any minority or low-income population or community. Although there are several Indian tribes nearby, a series of consultation meetings has resulted in alternatives carefully crafted to incorporate and resolve the tribal concerns identified. Therefore

environmental justice was dismissed as an impact topic.

Prime and Unique Agricultural Lands

In August 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as a soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to NRCS, none of the soils in the project area are classified as prime or unique farmlands. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this document.

Air Quality

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on air quality. Under each of the proposed management alternatives for Walnut Canyon National Monument, visitor use and administrative operations would generate similar levels of air pollutant emissions from motor vehicles and motorized equipment, water and sewage treatment operations, propane and natural gas-fueled appliances, and wood-burning stoves used to heat employee residences. Some dust and fumes would be generated during the maintenance, improvement, construction, or removal of roads, trails, and other facilities. The NPS would follow established policy requiring the use of energy-efficient and environmentally friendly products and processes whenever possible. Although public visitation and motor vehicle use are expected to increase during the next 20

years, levels of vehicle exhaust are not expected to dramatically increase or significantly contribute to regional air pollutant loads. Air quality impacts from prescribed burning will be addressed in a forthcoming fire management plan and environmental assessment.

None of the identified air pollutant sources would generate enough quantities to require a discharge permit under U.S. Environmental Protection Agency and Arizona Department of Environmental Quality regulations. The impacts of these emissions are deemed to be negligible on the local environment and regional air quality for the proposed action and all alternatives. Therefore, they are excluded from further environmental analysis.

Water quality

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on water quality. Impacts to intermittent drainage systems, wetlands/floodplains, and riparian environments are assessed separately in the Environmental Consequences section. Under each of the proposed management alternatives for Walnut Canyon National Monument, visitor use and administrative operations would require similar amounts of drinking water and generate similar levels of water pollutants from road runoff, facility maintenance operations, and water and sewage treatment operations. All wastewater and sewage from the visitor center, employee housing, and toilets is treated and discharged to lined evaporative lagoons. None of the existing or proposed facilities would be located in the vicinity of regulated surface waters or aquifer recharge areas. The nearest reliable aquifer beneath these facilities is at least 1,500 feet deep. The NPS would follow established policy requiring the use of water-conserving technology and

environmentally friendly products. Although public visitation and motor vehicle use are expected to increase during the next 20 years, the level of incidental hydrocarbon runoff from roads is not expected to dramatically increase or contaminate local waterways. For these reasons, the proposed action and all alternatives are deemed to have a negligible impact on the environment and water quality and this topic is excluded from further environmental analysis.

Geologic Resources

The President's Council on Environmental Quality guidelines for preparing environmental impact statements require the lead agency to analyze the impacts of the proposed action and alternatives on geologic resources. Impacts to soils, intermittent drainage systems, and hydrogeology are assessed separately in the Environmental Consequences section. NPS national policy prohibits the surface mining of soil, gravel, cinder, or rock materials for any park operations purposes, including the construction of roads or facilities. Under any of the proposed management alternatives for Walnut Canyon National Monument, most modifications to access roads and facilities would be limited to existing disturbed areas and would not likely require blasting or other modification of bedrock geology. Walnut Canyon was carved by stream erosion through the Kaibab Limestone and Coconino Sandstone formations. Paleontological resources are exposed in the limestone walls of the canyon. These have been documented in studies and are primarily small mollusk, brachiopod, and bivalve fossils. While there are a few documented incidents of illegal removal of fossils, they are believed to receive adequate protection by the NPS and to have little market value. The potential impacts to surface geologic outcrops from road or facility construction, visitor activities, or NPS operations would be

negligible. For these reasons, the proposed action and all alternatives are deemed to have a negligible impact upon geologic resources, and are excluded from further environmental analysis.

OUTSTANDING PARK VALUES AND RESOURCE CONCERNS

Walnut Canyon National Monument and the area immediately surrounding the monument contains hundreds of archeological sites dating mostly to the 11th, 12th, and early 13th centuries A.D. These sites and associated artifacts are the tangible remains of a prehistoric culture that flourished in the Flagstaff region from about A.D. 600 until 1400. Archeologists call this culture "Sinagua," in reference to the early Spanish name for this highland region, "Sierra Sinagua" (Mountain Range without Water). Scattered Sinagua families farmed the upland areas around Walnut Canyon for centuries, growing small gardens of corn, squash, and beans. Beginning in the late 1000s, however, the population grew significantly. By the mid-1100s, many people had moved into limestone alcoves below the canyon rim, where they constructed substantial dwellings with locally available stone and clay. Growing crops at scattered plots in the surrounding forest, raising children, making stone tools and other implements, and following the ancient ceremonial cycles that had been passed down for generations, the Walnut Canyon community thrived for about 150 years. Today, Walnut Canyon preserves a portion of the once extensive Sinagua cultural landscape. Multiroom residential sites (both cliff dwellings and open-air pueblos), isolated field structures, "forts," quarries, agricultural fields, shrines, rock art, and other features are now protected within the monument.

The dense concentration of prehistoric ruins, their exceptional state of preservation, and their unusual and highly

scenic setting in sheltered alcoves along the canyon walls, coupled with the threat of imminent destruction by commercial looters and misguided tourists, were key factors influencing the creation of Walnut Canyon National Monument. These original core values persist to the present day, and the archeological sites in the monument retain a high degree of integrity. Approximately 40 of the more than 240 archeological sites in the monument have been stabilized to some degree, but many retain substantial amounts of original masonry architecture and a more or less complete assemblage of artifacts.

The site density in the monument averages almost 100 sites per square mile, compared with typical densities of 40 sites per square mile in other areas of the ponderosa pine forest near Flagstaff. The high site density in Walnut Canyon reflects the area's biological richness in general. The canyon's natural abundance and diversity of plant and animal species provided a storehouse of resources that sustained the prehistoric inhabitants of Walnut Canyon.

Spanish explorers named the mountainous region around Flagstaff "Sierra Sinagua" for good reason. In a region renowned for its paucity of natural water sources, the deep pools and historically more reliable flows of Walnut Creek made this canyon singularly rare and valuable, even without the addition of its archeological treasures. The riparian values of Walnut Canyon have been severely altered, particularly by two upstream (Upper and Lower Lake Mary) dams. The downstream Santa Fe dam further affects the system, although to a much lesser degree. Collectively, these dams have greatly decreased seasonal water flows within the canyon, modified sediment transport, and decreased available moisture. These effects have combined to modify the natural distribution of native riparian species, including box elder, willows, cottonwoods,

and Arizona walnut trees (for which the canyon was named). Nevertheless, the comparative abundance of moisture in the canyon from remaining springs and seeps, relative to the surrounding uplands, continues to sustain a highly diverse and unusually abundant mix of plant and animal species.

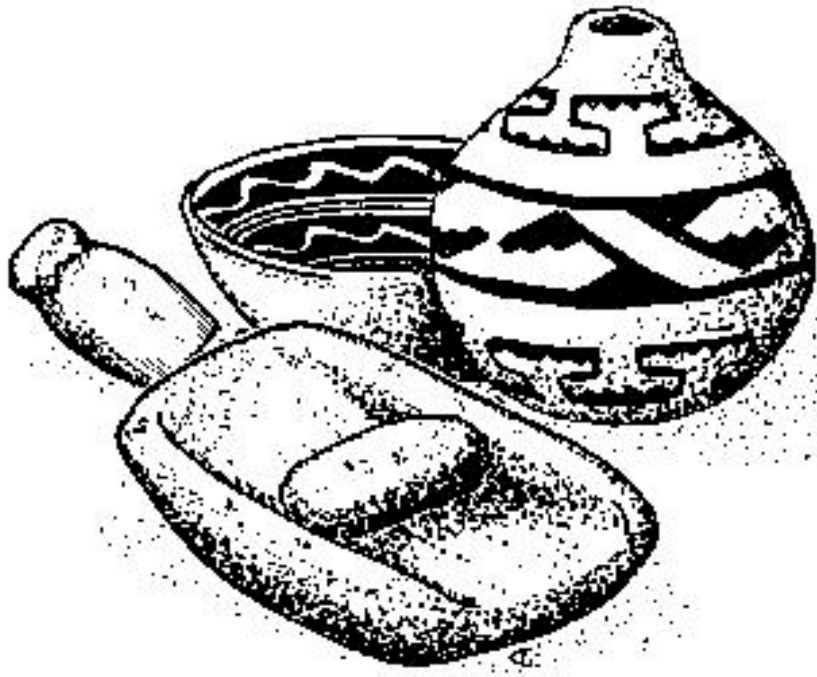
The varying exposures and elevations of Walnut Canyon, combined with seasonally abundant water compressed along a relatively narrow band within a larger expanse of ponderosa pine forest creates a natural biological "hot spot"-a concentrated area of biological productivity. Several different ecological communities overlap within Walnut Canyon, mixing species that are usually separated by elevation and creating a diverse assortment of microhabitats. Today, Walnut Canyon supports a wide diversity of animals and plants, including important large ungulates such as antelope, deer, and elk, large predators such as black bear and mountain lion, numerous raptors, and spotted owls, and an unusual assortment of plants. The linear expanse of Walnut Canyon also serves as an important wildlife migration corridor, linking the higher elevation forests around Lake Mary with the lower elevation pinyon and juniper woodlands to the east, as well as protecting strategic cross-canyon routes between Campbell and Anderson Mesas.

Walnut Canyon's ancient dwellings and rich assortment of plants and animals hold traditional cultural importance for several American Indian tribes in the area. Several Hopi clans maintain specific ancestral claims to the dwelling sites in Walnut Canyon. Certain Navajo and Apache clans claim affiliation to ancestral Pueblo sites in general. Numerous plant species were traditionally used by Hopis, Yavapais, Navajos, and Apache, and many of these plants continue to have importance for medicinal and ceremonial purposes. Today,

several culturally important plant species are found in much greater abundance within the monument than anywhere outside of it.

The scenic qualities of Walnut Canyon cannot be divorced from other values; nevertheless, the stunning views provided by the canyon continue to have importance to visitors and local residents. For as long as Euro-American settlers have lived in the Flagstaff area, Walnut Canyon has been a scenic and recreational

attraction for local residents and out-of-town visitors alike. This attraction continues to the present day. As Flagstaff continues to grow, the scenic and recreational value of Walnut Canyon as a relatively natural and undisturbed oasis on the edge of an urban setting will grow accordingly. Integrating future plans for this area within the broader regional Flagstaff Open Space Greenway plan is key to ensuring its long-term preservation.



ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES

Resource Analysis

As the first step in the alternatives development process, landscape units were plotted, sensitive resource areas were mapped, and existing visitor experiences (driving, hiking, viewing archeological sites) were identified. Natural and cultural resource inventories were evaluated. Visitor use statistics were gathered and studied. The planning team also discussed areas where visitors or park staff have noted problems in the past and sought the underlying reasons for those problems.

Landscape units plotted for Wupatki included: rolling grassland, flat grassland, juniper woodland, basalt mesas, shallow valley, canyons, cinder cone, Doney Cliffs, tilted benches, Painted Desert, Little Colorado River floodplain, washes, Wupatki Basin, lava flows, and cinder dunes. The appropriateness of these landscape units for use and development was considered.

Information on the following issues/existing conditions and resources was overlaid to create maps highlighting areas that were particularly sensitive to human use: boundary/adjacent uses, visitor use, roads/trails/development, boundaries/fences, impact areas, ethnographic/sacred sites, threatened/endangered/endemic species/habitat, wetlands, soils/geologic features, sensitive cultural areas, pristine areas, and safety concerns. In meetings with the Forest Service, maps showing cultural resource information (traditional cultural properties, National Register of Historic Places properties, collecting areas, inventoried archeological site densities,

and historic uses), sensitive species, current rules and regulations, stakeholders, and experiences were prepared.

This analysis aided in the development and placement of management zones and facilities in different alternatives. Desirable resource conditions and visitor experiences for each zone were identified. This analysis and the sensitive areas maps were consulted when decisions were made about how to place zones and facilities in different alternatives. Other measures taken to check feasibility and determine potential impacts included field-checking alternative ideas and proposals and consulting with resource experts and other agencies. Input from newsletters and scoping was also used to draft alternatives. Input from visitor surveys provided a better understanding of what visitors value, what their expectations are, and what problems they experience.

The goal was to ensure that the draft alternatives did not include actions with unacceptable effects on park resources or visitors or actions with no public support. For example, spotted owl protected activity centers (PACs) were mapped and development was not considered in those areas in order to protect the owls.

Management Zones

Within the broad parameters of the park mission and mission goals, various approaches to park resource protection, use, and development are possible. Different approaches can be used to address the decision points previously identified in the planning process (Purpose and Need, Decide What Might Be Achieved section). For all three Flagstaff Area monuments, potential management zones were identified and then applied for

each monument to meet the different alternative concepts developed.

Management zones identify how different areas of the park could be managed to achieve a variety of resources and social conditions and to serve recreational needs. Each zone specifies a particular combination of physical, biological, social, and management conditions. Different actions would be taken by the Park Service in different zones with regard to the types and levels of uses and facilities.

Ten possible zones were described that could be appropriate to various areas in the three Flagstaff Area monuments. Ideas for the range of zones came from responses to the newsletters and from park staff. In formulating alternatives for future park conditions and management, preparers placed these zones in different locations or configurations on the ground, based on different alternative concepts. The nine zones applicable to Wupatki National Monument are described below.

RESOURCE PRESERVATION ZONE

Resource Condition or Character

Resources in this area are fragile and may be in a range of conditions from pristine to endangered. Management actions for resource protection would be high, and tolerance for resource degradation would be very low.

Visitor Experience

Access to these areas would be restricted and permitted only for the purposes of research, traditional cultural activities, or other well-justified special uses. The areas would provide maximum preservation of fragile and/or unique resources, endangered species, sacred sites, and so on. Although access would be restricted, visitors could benefit from the experience of learning that particularly sensitive resources are preserved for future generations.

Appropriate Kinds of Activities or Facilities

There would be no facilities or developments for visitors, but off-site interpretation would be extensive, to promote visitor education about the value of resource protection. As noted, access would be by permit only for approved activities. Telecommunication infrastructure would not be permitted in this zone.

EXTENDED LEARNING ZONE

Resource Condition or Character

Visitors, sites, and trails would be intensively managed to ensure resource protection and public safety. Areas would be predominately natural, but the sights and sounds of people would be evident. Resources could be modified for essential visitor needs (such as trails and interpretive media) and park operation needs (such as hardening of archeological sites), but they would be changed in a way that harmonizes with the natural and cultural environment. Except for essential changes, the Park Service's tolerance for resource degradation would be low.

Visitor Experience

The emphasis in this experience would be on visiting and learning about significant park resources. These experiences could be either self-guided or ranger-led. Intimate interaction with resources would be offered where possible without undue resource impacts. Structure and direction would be provided, (e.g., trails, interpretive media, signs), but some opportunities for discovery would also be available. Visitors would need to exert some physical effort and make at least a moderate time commitment. At certain times of the day or season there could be opportunities for solitude, but in general there would be a moderate probability of encountering other visitors. The probability of encountering park staff and

other evidence of NPS management would be high.

Appropriate Kinds of Activities or Facilities

Trails (which could be surfaced and up to 5 feet wide), overlooks, and wayside exhibits and other interpretive media would be appropriate in these areas. Support facilities, such as rest rooms and small picnic areas, could also be present.

Predominant activities would include hiking, viewing resources, and attending interpretive walks and talks.

Telecommunication infrastructure would not be permitted in this zone.

GUIDED ADVENTURE ZONE

Resource Condition or Character

Resources in these areas would appear pristine. Low levels of management for resource protection and visitor safety would be appropriate in these areas, but any resource modifications would be minimal and would harmonize with the natural environment. Tolerance for resource degradation in these areas would be low.

Visitor Experience

Visitors would explore park resources as part of a guided group. Areas where this experience would be offered would usually be untrailed and free from developments. Intimacy with resources, learning, social interaction among the group, and the security of a guided experience would be key elements of this experience. The probability of encountering other groups would be low, and there would be some opportunities for individual solitude. The environment would offer a moderate level of challenge, but the need for individual outdoor skills would be low.

Appropriate Kinds of Activities or Facilities

No permanent facilities would be appropriate in these areas except for primitive trails if deemed necessary for resource protection. Hiking and camping with a guide would be the predominant activity in these areas. Telecommunication infrastructure would not be permitted in this zone.

MOTORIZED SIGHTSEEING ZONE

Resource Condition or Character

Intensive management would be provided in this area to ensure resource protection and public safety (e.g., fences, intensive law enforcement, and restrictions on visitor activities). Resources might be modified (e.g., paving or felling hazard trees) for essential visitor and park operational needs.

Visitor Experience

The paved roadways and associated developments in this area would be used for touring the park, enjoying scenic overlooks and interpretive media, and gaining access to other park areas. Visitor attractions would be convenient and easily accessible. The visitor experience would be generally dependent on a vehicle or bicycle, would involve driving along a well-maintained, paved road, and would be perceived as linear/sequential in nature. Observing the natural environment would be important, and there would be a sense of adventure, but there would be little need for visitors to exert themselves, apply outdoor skills, or spend a long time in the area. The probability of encountering other visitors would be high, and there would be a moderate probability of encountering NPS staff.

Appropriate Kinds of Activities or Facilities

The motorized sightseeing experience would occur in a substantially developed

area. The paved roads, pullouts, overlooks, and associated short trails and picnic areas, parking areas, and other facilities that support visitor touring would be included in these areas. Most facilities and some trails would be accessible in this area. Telecommunication infrastructure would not be permitted in this zone.

NATURAL AREA RECREATION ZONE

Resource Condition or Character

Designated trails could be paved and trailside resources manipulated to provide for safety or to prevent impacts off of the trail (e.g., erosion). However, such management actions would be aimed primarily at prevention of secondary impacts and not at trail improvements. There would be a low tolerance for resource degradation in these areas.

Visitor Experience

Emphasis in these areas would be on recreating in a natural setting, therefore, trails would be made of natural or natural-appearing materials. Visitors would be directed to use and stay on designated trails. There would be a moderate probability of encountering other visitors. A moderate amount of off-site interpretive media would be available, but there would not be any on-site interpretation in these areas.

Appropriate Kinds of Activities or Facilities

Facilities, including trails, would be primitive and lie lightly on the land. Improvements would only be made to prevent secondary impacts and provide the minimum safety required for natural setting recreation. Trails would be designed to accommodate a variety of exercise pursuits that can vary from activities on foot to bicycles and horseback; the area would not include motorized conveniences.

Telecommunication infrastructure would not be permitted in this zone.

OVERVIEW ZONE

Resource Condition or Character

Resources would appear natural, but paving or other management actions would be taken as necessary to protect resources. Visitors would interact with resources only to the extent possible without undue impact to those resources. Because of the need for visitors to understand park significance, some primary resources must be available for visitors to view in these areas.

Visitor Experience

Visitors would get an overview of park resources and significance in a short time frame and with a minimum of physical exertion. Park orientation and interpretation of primary park themes would be important elements of this experience. Interaction and encounters with other visitors and park staff would be common, but overcrowding would be avoided. Although structured intimacy with some park resources could be possible, viewing resources from a distance or from trail or overlook facilities would be more common.

Appropriate Kinds of Activities or Facilities

Sightseeing, learning about the park, short walks, and attending interpretive programs would be common activities in these areas. Orientation and interpretation facilities, such as visitor centers, kiosks, wayside exhibits, and other interpretive media would be appropriate. Support facilities such as rest rooms and picnic facilities could also be present. Telecommunication infrastructure would not be permitted in this zone.

ADMINISTRATIVE ZONE

Resource Condition or Character

The natural environment would be modified for park operation needs, but they would be changed in a way that harmonizes with the natural environment. These areas would not be close to sensitive natural or cultural resources, if such resources could not be adequately protected.

Visitor Experience

These areas would not be intended for visitor use; however, if visitor use did not conflict with the primary use of the area, incidental use could be permitted.

Appropriate Kinds of Activities or Facilities

Facilities necessary for park operations or surrounding land uses are appropriate in this area, including park maintenance yards, residential areas, access roads, and utility areas and corridors.

Telecommunication infrastructure would be permitted in this zone, in the following locations. For Wupatki, Sunset Crater, and Walnut Canyon radio repeater needs, NPS uses a site at O'Leary Peak on USFS lands. Installation of telecommunications equipment at this site would require permission from the Forest Service. A radio repeater was once located on Woodhouse Mesa near the park visitor center at Wupatki. The Park Service would consider requests for location of equipment at this site based on the ability to install the equipment without visual intrusion and without loss or disturbance of natural or cultural resources. Because of the fragile nature of the resource, no use of NPS land at Sunset Crater for telecommunications would be permitted. If a new visitor center were constructed near I-40 at Walnut Canyon, there could be an opportunity to locate telecommunication equipment there, or at the water tower that is part of the current administrative zone.

Boundary Expansion Criteria

WALNUT CANYON

As previously noted, Walnut Canyon National Monument was established by Presidential Proclamation in 1915 to preserve "prehistoric ruins of ancient cliff dwellings ... that "are of great ethnologic, scientific, and educational interest ... with as much land as may be necessary for the proper protection thereof." The monument was enlarged by Presidential Proclamation in 1938. In 1965, Public Land Order 1269 withdrew additional land for the specific purpose of constructing an entrance road to the park. In 1996, Public Law 104-333 expanded the boundaries of the park to include additional natural and cultural resources that directly contribute to the purpose and significance of the park. This most recent addition was the result of a 6,700-acre expansion proposed by the National Parks and Conservation Association and a local support group (Friends of Walnut Canyon) in the late 1980s and early 1990s. The legislation added 1,277 acres, previously administered by the Coconino National Forest and 53 acres of private land. It also confirmed the monument has administrative jurisdiction on the 370-acre entrance road. The park currently occupies approximately 3,600 acres immediately adjacent to the corporate limits of the city of Flagstaff, Arizona, and is entirely surrounded by the Coconino National Forest. There are approximately 291 acres of private land within the monument. The acreage is located on the east side, and only one landowner is involved.

During the course of this planning process and as specified in Section 604 of the National Parks and Recreation Act of 1978 (16 U.S.C. 1a-5 et seq.), careful consideration was given to the expansion of boundaries at Walnut Canyon. Authority for modifying park boundaries is contained in the Land and Water

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Conservation Fund Act amendments of June 10, 1977 (Public Law 95-42).

Consideration for modifications to the boundaries was based on one or more of the following criteria: (1) expansion would include significant resources or opportunities for public enjoyment, (2) expansion would address operational and management issues, or (3) expansion would protect monument resources critical to fulfilling the purpose of the park. Boundary expansions are considered practical or necessary if: (1) the added lands could feasibly be administered, taking into consideration the size of the proposed expansion, configuration, ownership, costs, and so on, and (2) that other alternatives for management and resource protection are not considered adequate.

A boundary expansion assessment determined that both natural and cultural resources that contribute to the purpose and significance of the monument still remain outside current monument boundaries. However, further expansion of existing boundaries at Walnut Canyon was not recommended at this time, because any further expansion efforts would unreasonably complicate the management and land use planning on adjoining lands, administered by other agencies. The Coconino National Forest is currently involved in a Flagstaff Lake Mary Ecosystem Analysis (FLEA), a planning process that addresses public uses on national forest land immediately surrounding the monument. The city of Flagstaff has recently produced and is implementing recommendations from an Open Space and Greenway Plan (1998), and is in the process of developing a Regional Land Use and Transportation Plan (1999 and 2001) that will address population growth issues adjacent to the park on the west side. Further, Coconino County is working on open space and preservation plans that will complement the management of Walnut Canyon. In

addition, there are three sections of Arizona State Trust land located immediate west and northwest of the park that if developed for residential or commercial purposes, could have an adverse impact on park resources and negatively influence the health of the canyon ecosystem. Currently, however, these lands are being nominated for inclusion under the Arizona Preserve Initiative. Efforts are also under way to get the state committed to managing their adjacent lands in a manner that would be compatible with the monument. Because of these efforts an alternative that identified the expansion of boundaries was not included in the general management plan.

There are, however, a number of circumstances that, if they were to occur, would require the National Park Service to reconsider the boundary expansion needs at Walnut Canyon. They include: (1) a change in ability or commitment by Coconino National Forest regarding the interface of USFS lands with the city of Flagstaff, (2) a change in the City of Flagstaff's commitment to limit development within the existing Urban Growth Boundary and to effectively manage density development along that boundary, and (3) a change in land use or the sale or exchange of State Trust lands that would result in residential or commercial development of these adjacent lands. Should any of these situations occur, or should there be a degradation of lands adjacent to and which contain resources that contribute to the significance of Walnut Canyon, the subject of boundary expansion will be reconsidered.

In presenting a discussion regarding boundary expansions, it is important to note that an effort is being undertaken by the National Parks and Conservation Association and the Friends of Walnut Canyon to seek a boundary expansion of the park through congressional action.

Their goal is to complete the proposal that they presented in the late 1980s and early 1990s that was only partially addressed with the expansion in 1996. The boundary expansion proposed by these organizations would certainly ensure the protection of significant resources that exist between the city of Flagstaff's Urban Growth Boundary and Walnut Canyon proper.

The park's land protection plan (NPS 1990) recommends acquisition of the existing inholding within the park, and the owner has expressed willingness to consider NPS acquisition through exchange, or purchase by the NPS. The NPS is currently working toward this goal, but water rights issues and archeological values are complicating the negotiations. In the past, the owner has expressed an interest in developing the property for recreational purposes, primarily fishing, and is interested in constructing a private residence on the rim of the canyon. However, the NPS believes the landowner is now fully aware of the implications that any such activities would have on the protection and preservation of the park's significant natural and cultural resources.

Actions Common to All Alternatives

Short-range planning is underway simultaneously with this GMP to meet immediate operational needs that will continue to exist regardless of the alternative selected. These are identified in National Park Service-wide initiatives, in Flagstaff Area National Monuments planning documents, such as the Strategic Plan, Annual Performance Plan, Comprehensive Interpretive Plan, and Resources Management Plan, and in local action plans to resolve safety, accessibility, facility maintenance, and similar issues.

PARTNERSHIPS AND REGIONAL PLANNING

All alternatives presented recognize the opportunity for partnerships for the protection of cultural and natural resources, with the USFS, the State of Arizona, Coconino County, the city of Flagstaff, and private landowners. It is anticipated that, for the life of this plan, USFS lands surrounding Walnut Canyon National Monument will continue under USFS management, in accordance with decisions reached in the Flagstaff Lake Mary Ecosystem Analysis (FLEA) process, but the two agencies will actively coordinate a variety of activities. There will be increased emphasis on monitoring the effects of recreation, grazing, and other human uses on these lands; documentation of unacceptable impacts will provide a basis for management changes to control those effects.

The monument's proximity to the city limits of Flagstaff will require close coordination with city and county planning efforts to ensure preservation of park resources and values. Conversely, both the city and county recognize the value of NPS participation in the preparation, review, and implementation of the Flagstaff Open Spaces and Greenways Plan, the Flagstaff Area Regional Land Use and Transportation Plan, and similar efforts, to achieve mutual goals.

INTERPRETIVE EXHIBITS

Planning and design of new wayside and museum exhibits is in progress, in accordance with the Flagstaff Areas Comprehensive Interpretive Plan, to improve visitor understanding and appreciation of Walnut Canyon resources. New wayside exhibits will replace and expand the existing system of interpretive signs along the entrance road and at major existing visitor use areas. New museum exhibits will replace the outdated

ALTERNATIVES

and inaccurate exhibits at the existing visitor center. Like the wayside exhibits, they will convey current knowledge of the park's natural and cultural resources and explain their significance.

ACCESSIBILITY

The National Park Service will remain committed to increasing accessibility to facilities, programs, and services for all visitors, including those with disabilities. New construction and modifications to existing public facilities will comply with the Americans with Disabilities Act and other requirements. To the extent feasible, access will be provided to natural and cultural resource features through modification of existing trails, pullouts, and so on. The Rim Trail will be improved to provide access at least to the canyon overlook, a pithouse, and a pueblo for those with mobility impairments. Where terrain or other constraints prevent physical access to major features, efforts will be made to provide alternative experiences through exhibits, photographs, electronic virtual tours, or other means.

SAFETY

Necessary actions will be taken in the course of all activities to ensure employee and visitor safety. All facilities work will be designed to upgrade and improve safety features.

New and remodeled facilities will be thoroughly evaluated during the design process to ensure that safety remains an upfront consideration. Actions will be taken as needed to address the threat of hantavirus, which is present in many older storage facilities throughout the park.

DESIGNATION OF CRITICAL HABITAT

The U.S. Fish and Wildlife Service (USFWS) recently designated critical habitat for the Mexican spotted owl within Walnut Canyon National Monument. Any proposed developments other than

nonconsumptive recreation use will require consultation with USFWS under the Endangered Species Act.

INHOLDING

There is a parcel of private land within the monument of approximately 291 acres. This inholding has been identified as desirable for acquisition in the monument's Land Protection Plan due to the presence of archeological and ecological resources that are integral to the significance and purpose of the monument.

EXISTING HOUSING AND MAINTENANCE

Existing housing and maintenance facilities will be retained in all alternatives.

BACKCOUNTRY MANAGEMENT

The backcountry of Walnut Canyon National Monument (defined as all areas beyond designated roads, trails, or developed facilities within the monument) has been closed to unguided entry for many years, and this policy will continue in all alternatives. Note, however, that some alternatives designate new roads and trails and conditions for their use by visitors.

A temporary exception has been made for the lands acquired in the 1996 boundary expansion, where most existing recreational uses have been allowed to continue, pending boundary surveys and resource inventories. The boundaries of these new lands will be fenced and signed, and appropriate recreational uses and locations will be determined in the future.

ALTERNATIVE DESCRIPTIONS

No-Action Alternative: Existing Conditions

Walnut Canyon National Monument is seven miles east of Flagstaff and is reached via a three-mile paved entrance road from I-40 (see Existing Conditions map). The

entrance station is located 1/4 mile north of the visitor center. There are three small picnic areas along the entrance road and another larger one near the visitor center.

Walnut Canyon National Monument preserves a portion of a once active prehistoric community. The shelter provided by the natural alcoves in the steep canyon walls and the diversity of flora and fauna were attractive to the people who lived here then just as they are to us today. The current management provides the public with a glimpse of the remnants of this community while protecting its sensitive features.

Walnut Canyon is operated as a day-use area, and the visitor center parking area is closed and gated at night. FR303 and other U.S. Forest Service roads allow 24-hour access to USFS lands surrounding the monument. Entrance fees are required at the monument; access is limited to established trails, roadways, and developed facilities. Areas not designated and identified for public activities are closed to unguided entry.

The road terminates in a parking area at the visitor center, which contains an information/fee collection desk, exhibits, a bookstore, and an observation room with a panoramic view. Maintenance facilities and park housing are located nearby. Additional details regarding the current use and development of the monument can be found in the Affected Environment, Operational Efficiency section.

Orientation and interpretation are accomplished primarily through the visitor center and the self-guided Island and Rim Trails. The Island Trail descends 185 feet into the canyon, passing six cliff dwellings with a total of 25 rooms. Many other cliff dwellings are visible across the canyon from the Island Trail. This strenuous 0.9-mile round trip is one of the best ways to experience the park. The fairly level 0.7-mile Rim Trail provides canyon views and

access to a pithouse and a surface pueblo. Various interpretive programs, including guided hikes to the historic ranger cabin and additional cliff dwellings, are offered as staffing permits.

Accessible rest rooms are located at the visitor center. The Rim Trail is currently partially accessible, but other trails are not, due to terrain.

The monument boundary was expanded in 1996 to include approximately 1,300 additional acres. The NPS would survey the new boundary and inventory natural and cultural resources. After this is done, consideration would be given to continuation of traditional, nonconsumptive, recreational activities in appropriate areas.

The NPS and USFS work cooperatively in the areas of law enforcement, wildland fire, resource protection and management, interpretation, and facility management and will continue to do so. NPS staff frequently assists visitors in finding suitable USFS lands on which to engage in recreational and other activities that may not be suitable on NPS lands. Conversely, USFS staff direct visitors who are looking for more structured interpretive visits to NPS lands. Cooperation extends to sharing of equipment and staffing, administration of special use permits, research permits, and a variety of other activities.

Visitor satisfaction with the current park experience is high, as measured by the 2000 Visitor Survey Card responses (Machlis 2000). The survey showed that 95% of visitors were satisfied with opportunities for "learning about nature, history or culture" and 81% were satisfied with "sightseeing opportunities." Ninety-eight percent were satisfied with outdoor recreation (camping, bicycling, boating, hiking, etc.) opportunities.

Alternative 1: Diversify Opportunities for Visitor Use

GENERAL CONCEPT

The goal of this alternative is to provide more diverse visitor experiences and access to more of the park (see Alternative 1 map), including areas acquired in the 1996 boundary expansion. This alternative emphasizes easier access to different parts of the monument, in order to decrease congestion at the visitor center and on the Island Trail. There would be more choices and opportunities for different types of visitor experiences. A variety of motorized and nonmotorized activities would be spread across the area north of the canyon rim. A new scenic drive would be developed along the north rim to disperse use to a new area and provide different views of the canyon. A portion of an existing USFS road would be used to link to the new scenic drive.

The existing visitor center would be remodeled to accommodate more visitor use by removing administrative offices. Parking would be redesigned and relocated away from the canyon rim, and visitors would walk a short trail to the canyon edge. The park would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Installation of an entrance station/fee collection facility near the I-40 intersection would be considered.

This alternative responds to public input regarding the need for increased sightseeing from automobiles; for hiking, biking, and horseback access; and for improved balance among various public uses. This alternative also responds to the concern that visitor use exceeds facility design capacity.

KEY ACTIONS

- The existing entrance road and picnic areas would remain, but parking and orientation would be redesigned and

relocated away from the canyon rim. Visitors would walk a short trail to the canyon and the existing visitor center. The existing parking area would be kept for handicapped and administrative parking only. The park would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303.

- Offices would be removed from the visitor center, and the building would be remodeled to allow more space for visitor orientation, new exhibits, and group presentations. New administrative offices would be constructed near the new parking area.
- An existing primitive USFS road would be substantially upgraded and new road segments would be constructed to provide a new scenic drive along the north rim. Initially, this would be a semiprimitive guided experience until improvements to existing dirt roads could be accomplished.
- A new pullout and/or turnaround would be constructed at the park entrance near the I-40 exit, and might include an entrance station/fee collection facility. New wayside exhibits at this location would better orient and prepare park visitors before they encounter park resources. Additional orientation media would be installed at the new parking area near the visitor center to alert visitors to the diverse experiences available (walking, driving, biking, guided hikes).
- In addition to the existing visitor center, self-guided trails, and ranger-led hikes, guided tours to the recently acquired First Fort archeological area would be possible via the new north rim scenic drive. Additional guided activities would occur in areas of the north rim. Interpretation and new wayside exhibits along the entrance and rim roads would provide the opportunity to learn about different

aspects of the park and its place in the regional story.

- Hiking, biking, and horseback riding would occur on existing roads and trails on the rim, in western portions of the newly acquired lands.
- Areas of the park not zoned for administrative or visitor use would be closed to protect resources.

Alternative 2 (Preferred): Emphasize Preservation

GENERAL CONCEPT

This alternative would preserve untrailed expanses, unfragmented natural systems, and relatively pristine resource conditions throughout much of the park (see Alternative 2 map). Walnut Canyon would be protected as a critical wildlife corridor. Visitation to Walnut Canyon would be managed with the goal of providing quality learning opportunities in a quieter, more intimate historic atmosphere. This alternative would provide a glimpse of the remnants of the prehistoric community and canyon flora and fauna, while protecting sensitive features and maintaining the health of the canyon ecosystem. Preservation and protection of threatened and endangered species, preservation of riparian habitat, and maintenance of the long-term integrity of systems and natural processes would be emphasized.

Because past management of Walnut Canyon has worked well, this alternative explores ways to keep future visitor experience and resource protection comparable to today's, by providing better ways to handle any increased visitation. The natural soundscape and tranquil setting of the canyon would be enhanced by removing some facilities from the rim area and placing them in a relatively less sensitive area near I-40. The park would remain day-use only, with the road gated at night near I-40 and at FR303. Ticketing,

reservation, or shuttle systems could be implemented in the future to alleviate traffic congestion and maintain quality visitor experiences. The new visitor center and parking lot would be designed to include collection of entrance fees and to be readily adaptable for shuttle system use if needed in the future. Current recreational uses in the western end of the monument would be redirected to nearby USFS lands.

Consistent with this concept, efforts would be made to provide a broader range of educational offerings. Some of these experiences would be provided through partnerships with other agencies or organizations. The ratio of visitors to educators would be kept low to provide for a personalized experience. Compared with the No-Action Alternative, more ranger-guided tours would be offered to archeological sites. Acquisition of private land in the park would facilitate providing this alternative's visitor experiences.

KEY ACTIONS

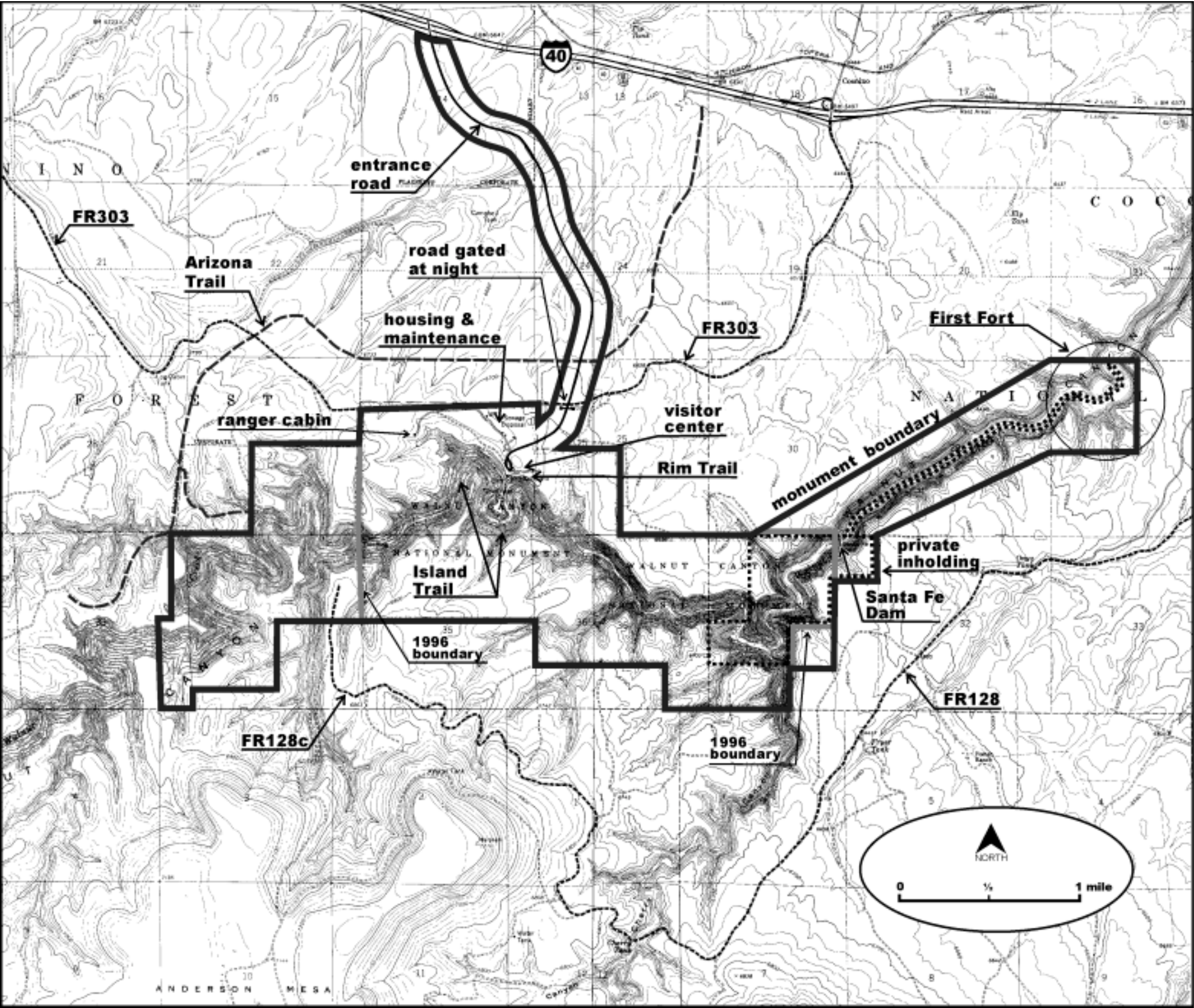
- The existing entrance road and parking area would be retained and used as they are now unless crowding increases to the point that visitor experiences and/or resources are degraded. Then actions would be taken to control visitor numbers.
- A new fully accessible visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources, and to collect entrance fees. Visitation numbers could be managed from this location when necessary.
- The modern additions to the existing historic Civilian Conservation Corps (CCC)-constructed visitor center would be removed, making the building less visible on the rim and restoring the small, intimate nature of the historic structure. The remaining portion would be adaptively used for both trailhead

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and canyon orientation and as an educational center for more in-depth learning opportunities, such as ranger talks, special events, workshops, seminars, demonstrations, and so on.

- Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road while allowing 24-hour use of FR303.
- Within the Extended Learning Zone, self-guided trails and ranger-led activities in the vicinity of the current visitor center would remain as they are now. The potential exists to develop self-guided activities using existing primitive roads to the ranger cabin area. Efforts would be made through development of new media to provide a broader range of educational and interpretive programs aimed at in-depth learning. Some of these experiences would be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies.
- Visitors would have access to the eastern end of the park via ranger-guided hikes. An existing USFS road would be upgraded and used administratively to facilitate these guided activities. A parking area would be established within the monument from which the guided hikes would be staged.
- Visitors desiring hiking, biking, or horseback riding experiences would be directed to nearby forest land, where such experiences are already available.
- Areas of the park not zoned for visitor or administrative uses would be closed to protect resources.

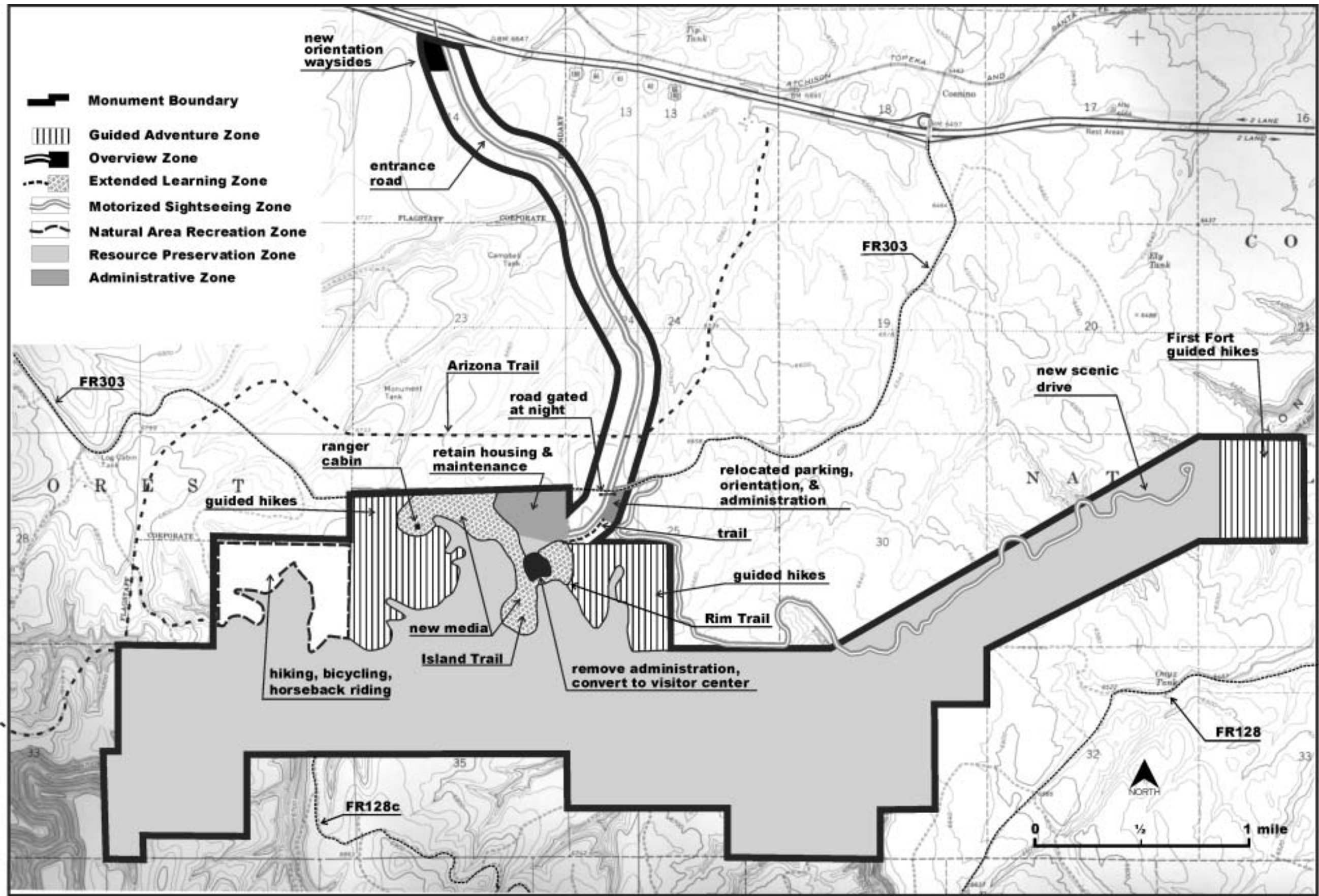




Walnut Canyon National Monument - Arizona
Existing Conditions

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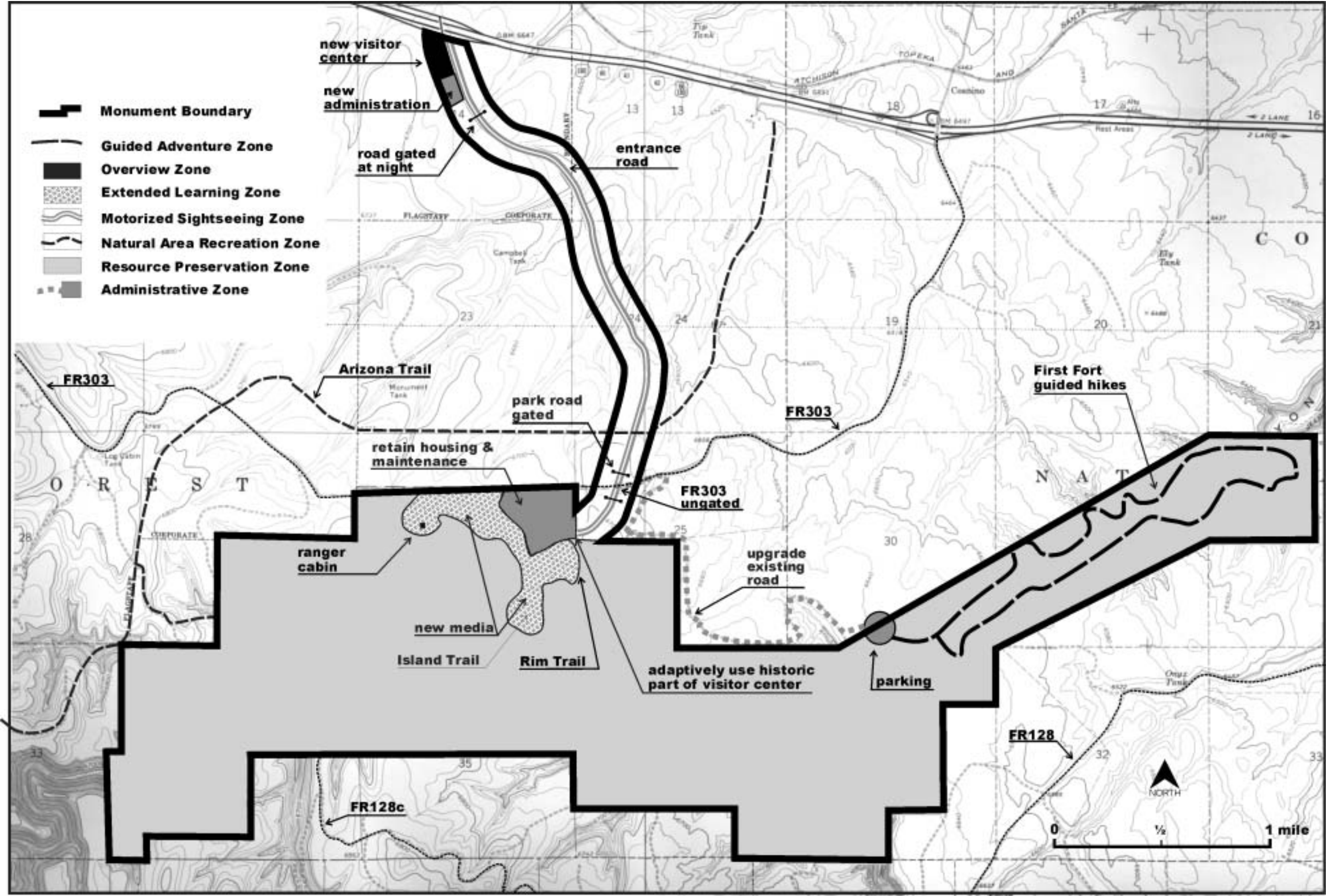
UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE



Walnut Canyon National Monument - Arizona

Alternative 1

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UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE



Walnut Canyon National Monument - Arizona

Alternative 2

(Preferred)

UNITED STATES DEPARTMENT OF THE INTERIOR - NATIONAL PARK SERVICE

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MITIGATING MEASURES

Under any of the action alternatives proposed, there would be mitigating measures used to reduce the effects of actions. They include the following.

Preservation, rehabilitation, and restoration, as well as the daily, cyclical, and seasonal maintenance of cultural resources, would be undertaken in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Wherever possible, new facilities would be located to avoid impacts to important park resources and values. In many areas soils and vegetation are already impacted to a degree by various human and natural activities. Construction would take advantage of these previously disturbed areas wherever possible.

All new construction would be completed using sustainable practices, such as the use of environmentally friendly materials, sustainable building materials, and efficient utility systems. Components of such projects would also be assessed for visual quality. Utilities and support functions, such as water, sewer, electricity, roads, and parking areas will be evaluated and designed to mitigate visual impacts.

Temporary impacts associated with construction would occur, such as soil and vegetation disturbance and the possibility of soil erosion. In an effort to avoid introduction of exotic plant species, no hay bales would be used. Hay often contains seed of undesirable or harmful alien plant species. Therefore, on a case-by-case basis the following materials may be used for any erosion control dams that may be necessary: rice straw, straws determined by NPS to be weed-free (e.g., Coors barley straw or Arizona winter wheat straw), cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales. Standard erosion control

measures such as silt fences and/or sand bags would also be used to minimize any potential soil erosion.

Potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows. The use of conserved topsoil would help preserve microorganisms and seeds of native plants. The topsoil would be respread in as near to the original location as possible and supplemented with scarification, mulching, seeding, and/or planting with species native to the immediate area. This would reduce construction scars and erosion.

Although soil side-cast during construction would be susceptible to some erosion, such erosion would be minimized by placing silt fencing around the excavated soil. Excavated soil may be used in the construction project; excess soil would be stored in approved areas. If used, silt fencing fabric would be inspected weekly or after every major storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full. Silt removal would be accomplished in such a way as to avoid introduction into any wetlands or flowing water bodies.

Revegetation plantings would use native species from genetic stocks originating in the park. Revegetation efforts would be to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible to preconstruction conditions shortly after construction activities are completed. The principal goal is to avoid interfering with natural processes.

Some petrochemicals from construction equipment could seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks. Any blasting would conform with NPS-65, Explosives Use and Blasting Program (1991), specifications. All

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blasting would use the minimum amount necessary to accomplish the task. All blasting would be used to shatter, not distribute, any material.

Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.

Prior to any land-modifying activity, a qualified professional archeologist would inspect the present ground surface of the proposed development site and the immediate vicinity for the presence of cultural remains, both prehistoric and historic. Should newly discovered or previously unrecorded cultural remains be located, additional investigations would be accomplished prior to earth-disturbing activities. Similarly, in those areas where subsurface remains appear likely, an archeologist would be on hand to monitor land-modifying actions.

Construction activities would affect the uppermost layers of earth as vehicles compact the soils and alter the horizontal and vertical distribution of buried archeological remains. These activities would also destroy surface sites by damaging and destroying artifactual remains and their contextual environments. Loss of these resources could be partially mitigated through excavation and curation prior to construction. Additional archeological investigations, including recording and mapping, and a rigorous program of sampling/collecting/testing of archeological features and artifacts would be performed in those areas where

cultural remains would be affected by the plan.

Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the park would consult with the State Historic Preservation Officer/Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the American Indian Graves Protection and Repatriation Act (1990) would be followed.

The Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment traffic would be minimized in the area of the site. Equipment and materials staging areas would also avoid known archeological and ethnographic resources.

Efforts to identify ethnographic resources will continue in consultation with traditionally associated tribes. A traditional use study will be conducted to understand how associated tribes have used park resources in the past and will need to continue to use them in the future. Based on the results of the study, agreement documents will be developed with associated tribes to ensure access to traditionally used resources in keeping with NPS policies Executive Order 13007. Tribal consultation will continue to take place with the implementation of individual undertakings pursuant to the NHPA to ensure that previously unidentified ethnographic resources are not affected.

The flow of vehicle traffic on roads would be maintained as much as possible during construction periods. Construction delays would normally be limited. There may be some periods when the nature of the construction work may require temporary road closures. All efforts would be made to reduce these as much as possible and to alert park staff as soon as possible if delays longer than normal are expected. Visitors would be informed of construction activities and associated delays. Traffic would be managed to ensure timely access to private residents and ranches along the road.

Contractors would coordinate with park staff to reduce disruption in normal park activities. Equipment would not be stored along the roadway overnight without prior approval of park staff. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, an appropriate housekeeping.

SELECTION OF THE PREFERRED ALTERNATIVE

In order to develop proposed actions, all of the alternatives for each park were evaluated. To minimize the influence of individual biases and opinions, the team used an objective analysis process called "Choosing by Advantages" (CBA). This process, which has been used extensively by government agencies and the private sector, evaluates different choices (in this case, the alternatives for each park) by identifying and comparing the relative advantages of each according to a set of criteria.

One of the greatest strengths of the CBA system is its fundamental philosophy: decisions must be anchored in relevant facts. For example, the question "Is it more important to protect natural resources or cultural resources?" is "unanchored," because it has no relevant facts on which

to make a decision. Without such facts, it is impossible to make a defensible decision.

The CBA process instead asks which alternative gives the greatest advantage. To answer this question, relevant facts would be used to determine the advantages the alternatives provide. To ensure logical and trackable process, the criteria used to evaluate the alternatives were derived from the impact topics in the EIS. Alternatives were evaluated to see how well they:

- **MAXIMIZE PROTECTION OF CULTURAL RESOURCES** (long-term integrity of archeological resources and cultural landscapes, historic character of the built environment, long-term integrity of ethnographic resources)
- **MAXIMIZE PROTECTION OF NATURAL RESOURCES** (long-term integrity of natural systems and processes, threatened and endangered species and sensitive species, long-term integrity of geological features, floodplains and riparian habitat)
- **EXPAND DIVERSITY OF VISITOR EXPERIENCE** (ability to experience full range of resources related to significance, provide a diversity of opportunities to experience park resources, and perceived wild character)
- **LIMIT EFFECT ON NEIGHBORS** (park neighbors; local, state, and tribal land management; land/resource managing agencies)
- **IMPROVE OPERATIONAL EFFICIENCY** (health and safety, conservation, distance to work, management of resources, communication)

Alternatives for each of the three monuments were rated on the attributes relating to each of the factors just listed. Then the advantages of the attributes were compared and the alternative with the most advantages was selected. Costs

ALTERNATIVES

for each alternative versus advantages provided were compared and analyzed.

A GMP provides a framework for proactive decision making, including decisions on visitor use, natural and cultural resource management, and park development. The plan prescribes resource conditions and visitor experiences that are to be achieved and maintained over time. Park development is considered in general needs rather than in specifics. For the purposes of cost estimating, general assumptions are made regarding amounts and sizes of development. These assumptions are then carried across to all alternatives so that comparable costs can be considered for each alternative.

Staffing considerations are considered to be a part of life cycle costing. The existing staff for the three monuments totals 42, which includes shared management, division chiefs, and administration.

Approximating a breakdown between the parks, the staffing is Wupatki, 16, Walnut Canyon, 14, and Sunset Crater Volcano, 12. The current staffing provides minimal resource protection and visitor service, and many tasks within the monuments are being deferred. The parks' 5-year FTE projection increases staffing levels in all three monuments by one-third. By park, the staffing would be Wupatki, 21.3, Walnut Canyon, 18.7, and Sunset Crater Volcano, 16. These figures are base staffing needed for the No-Action Alternative. Staffing increases needed by different alternatives are included in Appendix C. Those costs are included in Table 1: Summary of Comparative Costs.

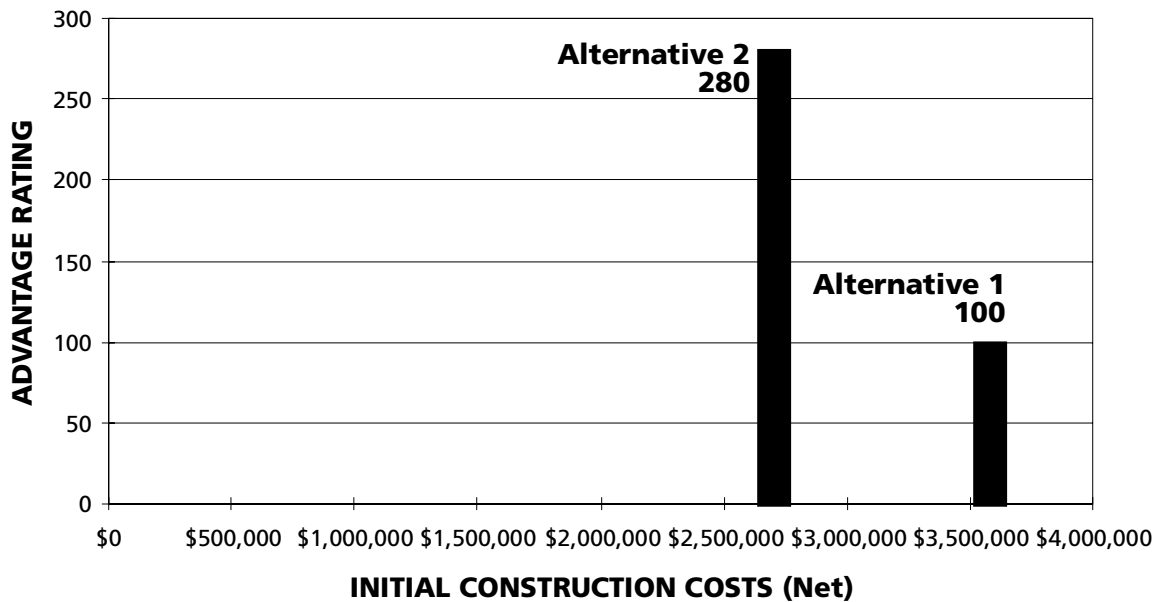
Costs identified in the GMP are not intended to replace more detailed consideration of needs, sizes, and amounts of future development. They should not be used as a basis for money requests until further analysis has been completed. Costs and items considered are shown in appendix C.

Comparative costs for the alternatives include both initial development costs and total life cycle costs. Initial development costs are the estimated construction costs of the alternatives. Demolition, labor, and materials for buildings, roads, trails, exhibits, and parking are included. Estimated costs are based on costs for similar types of development in other parks from the Denver Service Center Class "C" Estimating Guide. Life cycle costs consider the costs of each alternative over a period of time. Life cycle costs include the costs of operating buildings, the staffing required, maintenance, and replacement costs of alternative elements. The life cycle costs below are for a 25-year period. It is important to note that all estimate are general, in keeping with the general nature of GMP alternatives, and should be used for comparison purposes only.

Table 1: Summary of Comparative Costs (FY 2000 Dollars)		
	Alternative 1	Alternative 2 (Preferred)
Initial Development Costs	\$3,531,000	\$ 2,687,000
Total Life Cycle Costs (Present Worth)	\$4,447,000	\$3,945,000

Selection of the preferred alternative considers the advantages provided by each alternative (from the CBA) as compared to the cost of the alternative. The chart below summarizes the results. Alternative 2 provides the greatest advantages and is the lowest cost. Alternative 1 provides a slightly more diverse Visitor experience, but had substantially less resource protection.

Choosing by Advantages



ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101:(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and

maintain, wherever possible, an environment which supports diversity, and variety, of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

Generally this means the alternative that causes the least damage to the biological and physical environment. It also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources." (Council on Environmental Quality, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" [40 CFR 1500-1508], Federal Register Vol. 46, No. 55, 18026-18038, March 23, 1981: Question 6a).

The No-Action Alternative represents the current management direction for Walnut

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Canyon National Monument. The existing use and development of the park is based on planning initiated and implemented during the Mission 66 program. Personal services interpretation and resource protection patrols are sporadic at the two archeological interpretive areas (Island and Rim trails and at ranger cabin). Resource protection patrols are even less frequent on the south side of the canyon. The majority of visitors to the park see the two archeological areas on their own with no on-site NPS presence. The ranger cabin area is by guided tour only. For resource protection purposes, areas of the park other than the developed sites and administrative areas are closed to unguided entry. Since the No-Action Alternative maintains the Mission 66 visitor experience, diversity of educational opportunities is limited. Protection of cultural and natural resources would be less enhanced than under Alternative 2. Visitor opportunities would not be as diverse as under Alternative 1. The No-Action Alternative does not fully realize provisions 3, 4, 5, and 6 of the goals.

Alternative 1 provides more diverse visitor experience and access to more of the park to decrease congestion at the visitor center and on the Island Trail meeting goals 3 and 5 of the National Environmental Policy Act. A variety of motorized and nonmotorized activities would be spread across the area north of the canyon rim. Parking would be redesigned and relocated away from the canyon rim, and visitors would walk a short trail to the canyon edge. The park would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Gating the road may disrupt recreational use of the road (such as biking and jogging) and may affect access to grazing allotments, not fully realizing goal 4. The existing visitor center would be remodeled to accommodate more visitor use by removing administrative offices, and a new scenic drive would be

developed along the north rim to disperse use to a new area and provide different views of the canyon. Construction of a scenic drive in the east end of the park would fragment wildlife habitat, not meeting goal 6 of the National Environmental Policy Act. Areas of the park not zoned for administrative or visitor use would remain closed to protect resources, partially realizing goal 6. As compared to the No-Action Alternative and Alternative 2, Alternative 1 meets goals 3 and 5 by providing more diverse visitor experiences, and partially realizes goals 4 and 6. Protection of natural and cultural resources would not be as enhanced as under Alternative 2.

Alternative 2 would preserve untrailed expanses, unfragmented natural systems, and relatively pristine resource conditions throughout much of the park. Walnut Canyon would be protected as a critical wildlife corridor, meeting goal 6 of the National Environmental Policy Act. Visitation to the park would be managed with the goal of providing quality learning opportunities in an intimate atmosphere while maintaining the health of the canyon ecosystem. Preservation and protection of threatened and endangered species, preservation of riparian habitat, and maintenance of the long-term integrity of systems and natural processes would be emphasized. Efforts would be made to provide a broader range of educational programs (ranger guided hikes in the east end of the park and a self-guided trail to ranger cabin), partially realizing goals 3 and 5 of the National Environmental Policy Act. The park entrance road would be gated at night, while allowing 24-hour use of FR303. Gating the road may disrupt recreational use of the road (such as biking and jogging) and may affect access to grazing allotments, not fully realizing goal 4. Compared with the No-Action Alternative and Alternative 1, Alternative 2 provides

the greatest protection to the cultural and natural resources of the park.

After careful review of potential resource and visitor impacts, and developing proposed mitigation for impacts to natural and cultural resources, the environmentally preferred alternative is Alternative 2. Alternative 2 surpasses the other alternatives in best realizing the full range of national environmental policy goals as stated in § 101 of the National Environmental Policy Act. Although other alternatives may achieve greater levels of individual protection for cultural resources or natural resources, or better enhance visitor experience, Alternative 2 overall does (1) provides a high level of protection of natural and cultural resources while concurrently attaining the widest range of neutral and beneficial uses of the environment without degradation; (2) maintains an environment that supports diversity and variety of individual choice; and, (3) integrates resource protection with an appropriate range of visitor uses.

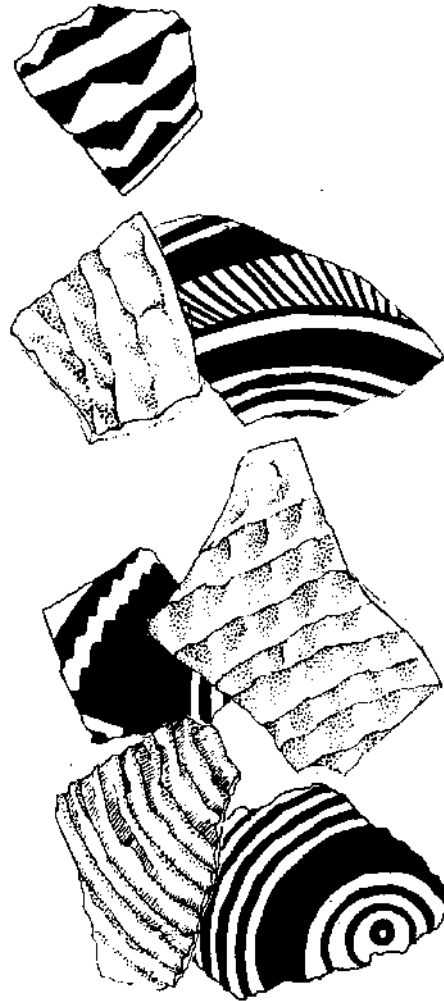


Table 2: Summary of Alternatives

No-Action Alternative: Existing Conditions	Alternative 1: Diversity Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
<p>Under the No-Action Alternative visitors would continue to access Walnut Canyon via a three-mile paved entrance road from I-40 and the entrance station 1/4 mile north of the visitor center. The three small picnic areas along the entrance road and another larger one near the visitor center would remain. The public would continue to be provided with a glimpse of the remnants of a once-active prehistoric community while protecting its sensitive features. The monument would continue to be operated as a day-use area, and the visitor center parking area would be closed and gated at night. Entrance fees would continue to be collected at the monument and access would continue to be limited to established trails, roadways, and developed facilities. Areas not designated and identified for public activities would remain closed to unguided entry. The road terminates in a parking area at the visitor center, which contains an information/fee collection desk, exhibits, a bookstore, and an observation room with a panoramic view. These facilities would continue to be available. Location of maintenance facilities and park housing would remain unchanged. Orientation and interpretation would continue to be accomplished via the visitor center and the self-guided Island and Rim Trails. Various interpretive programs, including guided hikes to the historic ranger cabin and additional cliff dwellings, would continue to be offered as staffing permits. The</p>	<p>Under Alternative 1, the existing entrance road and picnic areas would remain, but parking and orientation would be redesigned and relocated away from the canyon rim. Visitors would walk a short trail to the canyon and the existing visitor center. The existing parking area would be kept for handicapped and administrative parking only. The park would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Offices would be removed from the visitor center, and the building would be remodeled to allow more space for visitor orientation, new exhibits, and group presentations. New administrative offices would be constructed near the new parking area. An existing primitive USFS road would be substantially upgraded and new road segments would be constructed to provide a new scenic drive along the north rim. Initially, this would be a semiprimitive guided experience until improvements to existing dirt roads could be accomplished. A new pullout and/or turnaround would be constructed at the park entrance near the I-40 exit, and might include an entrance station/fee collection facility. New wayside exhibits at this location would better orient and prepare park visitors before they encounter park resources. Additional orientation media would be installed at the new parking area near the visitor center to alert visitors to the diverse experiences available (walking, driving, biking, guided</p>	<p>Under Alternative 2, the existing entrance road and parking area would be retained and used as they are now unless crowding increases to the point that visitor experiences and/or resources are degraded. Then actions would be taken to control visitor numbers. A new fully accessible visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources, and to collect entrance fees. Visitation numbers could be managed from this location when necessary. The modern additions to the existing historic Civilian Conservation Corps (CCC)-constructed visitor center would be removed, making the building less visible on the rim and restoring the small, intimate nature of the historic structure. The remaining portion would be adaptively used for both trailhead and canyon orientation and as an educational center for more in-depth learning opportunities, such as ranger talks, special events, workshops, seminars, demonstrations, and so on. Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road while allowing 24-hour use of FR303. Within the Extended Learning Zone, self-guided trails and ranger-led activities in the vicinity of the current visitor center would remain as they are now. The potential exists to develop self-guided activities using existing primitive</p>

ALTERNATIVES

Table 2: Summary of Alternatives

No-Action Alternative: Existing Conditions	Alternative 1: Diversity Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
<p>monument boundary was expanded in 1996. The NPS would survey the new boundary and inventory natural and cultural resources. After this is done, consideration would be given to continuation of traditional, nonconsumptive, recreational activities in appropriate areas. The NPS and USFS would continue to work cooperatively in the areas of law enforcement, wildland fire, resource protection and management, interpretation, and facility management.</p>	<p>hikes). In addition to the existing visitor center, self-guided trails, and ranger-led hikes, guided tours to the recently acquired First Fort archeological area would be possible via the new north rim scenic drive. Additional guided activities would occur in areas of the north rim. Interpretation and new wayside exhibits along the entrance and rim roads would provide the opportunity to learn about different aspects of the park and its place in the regional story. Hiking, biking, and horseback riding would occur on existing roads and trails on the rim, in western portions of the newly acquired lands. Areas of the park not zoned for administrative or visitor use would be closed to protect resources.</p>	<p>roads to the ranger cabin area. Efforts would be made through development of new media to provide a broader range of educational and interpretive programs aimed at in-depth learning. Some of these experiences would be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies. Visitors would have access to the eastern end of the park via ranger-guided hikes. An existing USFS road would be upgraded and used administratively to facilitate these guided activities. A parking area would be established within the monument from which the guided hikes would be staged. Visitors desiring hiking, biking, or horseback riding experiences would be directed to nearby forest lands, where such experiences are already available. Areas of the park not zoned for visitor or administrative uses would be closed to protect resources.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
Archeological Resources	The No-Action Alternative would have a major beneficial effect on maintaining the long-term integrity of the majority of archeological resources within the monument by concentrating visitor activities and park management impacts on previously disturbed and stabilized sites. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	Alternative 1 would have a major long-term adverse effect on at least 20% of the archeological resources (60-70 archeological sites) in the monument. This adverse effect would be offset to some degree by benefits derived from visitors receiving more education and an enhanced appreciation of the resources from expanded interpretive media and from participating in guided adventures. However, the net effect would be a significant increase in the degradation of sensitive archeological resources caused by construction of the north rim scenic drive and the increased visitor access to backcountry resources, and the inevitable impacts that would result from increasing visitation to archeological sites. The direct, indirect and cumulative impacts of Alternative 1 would have a major long-term adverse effect on archeological resources in the monument. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	Alternative 2 would result in moderately adverse long-term effects to approximately 14-20 archeological resources as a result of implementing this alternative. There would be an overall reduction of archeological integrity at these sites, but not to the extent that the resources would become ineligible for listing in the National Register of Historic Places. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
Historic Character of Build Environment	<p>The No-Action Alternative would have minor to moderate long-term visual impacts on the prehistoric and CCC landscapes, and a long-term moderate, adverse impact on the CCC visitor center. There would be an overall reduction of integrity in the prehistoric and CCC landscapes, but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places. Any future alterations to the prehistoric, CCC or Mission 66 landscapes, in conjunction with the minor to moderate cumulative impacts of previous changes and this alternative, could result in moderate cumulative impacts to the prehistoric, CCC and Mission 66 landscapes. In addition to those mentioned, there would be other less severe impacts as a result of implementing this alternative.</p>	<p>Alternative 1 would have long-term moderate, adverse impacts on the prehistoric landscape and long-term moderate adverse impacts on the CCC/Mission 66 visitor center. There would be an overall reduction of historic integrity of the prehistoric landscape and the CCC/Mission 66 visitor center, but not to the extent that they would no longer be potentially eligible to be listed in the National Register of Historic Places. Any future alterations to the prehistoric landscape or the visitor center, in conjunction with the moderate, adverse cumulative impacts of previous changes and this alternative could result in moderate, adverse cumulative impacts to the prehistoric landscape and the CCC/Mission 66 visitor center. In addition to those mentioned, there would be other less severe impacts as a result of implementing this alternative.</p>	<p>Alternative 2 would have long-term moderate adverse impacts on the prehistoric landscape, the ranger cabin landscape, and the Mission 66 landscape. However, this alternative would also have long-term major benefit to the prehistoric landscape by removing the Mission 66 portion of the visitor center and reducing the visual impact to the prehistoric canyon landscape. There would also be a long-term major benefit to the CCC visitor center by returning the developed area to a more intimate, rustic setting. There would, however, be an overall reduction of historic integrity in the landscapes (prehistoric, ranger cabin, CCC and Mission 66), but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places. Any future alterations of the landscapes, in conjunction with the adverse cumulative impacts of previous changes and the preferred alternative, could result in major, adverse cumulative impacts to each landscape. In addition to those mentioned, there would be other less severe impacts as a result of implementing this alternative.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
Ethnographic Resources	The No-Action Alternative would perpetuate any current and ongoing moderate to major effects to ethnographic resources, both adverse and beneficial, including vandalism from visitor access, limitation of access by tribe members to culturally significant resources or places for traditional cultural purposes, both adverse effects, and a beneficial effect as a result of improving and correcting interpretive media about tribal histories and cultural values, with the involvement of associated tribes. In addition to those mentioned, there would be other less severe effects of implementing this alternative.	The effects of Alternative 1 would be both adverse and beneficial, depending on the degree of tribal involvement in park planning. The increased impacts to archeological sites as a result of building new facilities and allowing increased visitation to numerous additional sites would also constitute a major impairment to ethnographic resources. In addition to those mentioned, there would be other less severe effects of implementing this alternative.	Overall, the preferred alternative would have beneficial effects on ethnographic resources. Some adverse effects, associated with archeological resources, would remain. Further consultation with the tribes may reveal that the impacts to archeological resources from this alternative are moderate, rather than major, and therefore, the potential impacts identified may not constitute an impairment to ethnographic resources. In addition to those mentioned, there would be other less severe effects of implementing this alternative.
Natural Systems and Processes	Under the No-Action Alternative, natural systems and processes would be sustained with relatively few long-term adverse environmental impacts, except for those that are attributable to increasing visitation, historic land use, and regional watershed, airshed, and ecosystem degradation. Soils, intermittent drainage systems, vegetation, and wildlife are generally stable, and inherent biodiversity is relatively	Under Alternative 1, natural systems within Walnut Canyon National Monument would continue to recover from historic land use impacts. NPS operations and visitor activities around the existing north-central canyon area, and fencing the 1996 boundary area would have similar impacts to those identified for the No-Action Alternative. The combined impact of the new road system, trail corridors, and dispersed	Under Alternative 2, natural systems within Walnut Canyon National Monument would continue to recover from historic land use impacts. The impacts from NPS operations and visitor activities around the existing north-central canyon area, continued daytime use of the existing entrance road, fencing the 1996 boundary area, and closing the 1996 boundary expansion area to recreational activities would be similar to

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	<p>intact. The NPS would manage for the continued recovery of natural systems from historic land uses and restore fire to the ecosystem. No new visitor facilities would be developed, therefore avoiding related adverse impacts. Continued use of the entrance road would have negligible to long-term, minor adverse impacts to natural systems, with a greater degree of adverse impact to wildlife. NPS operations and visitor activities are causing long-term, minor adverse impacts around interpretive areas and support facilities within the north-central canyon rim area. Most of the area within the monument is closed to the general public to protect sensitive resources, which ensures the long-term integrity of natural systems and processes. Fencing the 1996 boundary expansion area would have long-term, moderate beneficial impacts to solitary wildlife species. The availability of the monument for public enjoyment might influence regional urban development around Flagstaff and cumulative impacts to regional natural</p>	<p>hiking across the entire north canyon rim would magnify adverse impacts such as unplanned trail segments, soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. Sustained daytime human presence and traffic noise along most of the north canyon rim would have long-term, moderate adverse impacts to solitary wildlife species within the narrow canyon. Some of the impact to wildlife would be mitigated by the nighttime closure of the monument. The new road and visitor use areas would also provide for dispersal of nonnative plant species virtually anywhere within the north rim area. Alternative 1 would result in long-term, moderate adverse cumulative impacts to natural systems and processes within the monument. The area impacted by NPS facilities and frequent visitor use would increase from 5% to an estimated 20% of the total area within the monument. Alternative 1 would result in no major impacts on natural systems and processes in Walnut</p>	<p>those identified for the No-Action Alternative. Nighttime closure of the entrance road from I-40 to the existing visitor center would have long-term, minor beneficial impacts to wildlife. The development of a new visitor center at I-40 would have localized, long-term minor adverse impacts to natural systems and processes. However, the new facilities would enable the future management of visitor crowding, traffic congestion, and resource degradation along the north-central canyon rim area, offsetting impacts from constructing the facilities. Increased visitor access and activity within the proposed Extended Learning Zone along the north-central canyon rim would have long-term, minor adverse impacts. The proposed improved road to the east canyon rim would have long-term, minor adverse impacts to most aspects of natural systems. Depending upon the frequency and timing of traffic, motor noise could have long-term, moderate adverse impacts to solitary species that currently use remote areas of Walnut</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	<p>systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term conservation area.</p> <p>Approximately 5% of the total monument area would remain impacted by visitor use and NPS support infrastructure. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.</p>	<p>Canyon National Monument. In addition to those mentioned, there would be other less severe impacts as a result of implementing this alternative.</p>	<p>Canyon. Visitor use would be expanded into the east canyon floor within the proposed Guided Adventure Zone. This would cause long-term, minor adverse impacts to most aspects of natural systems, but depending on the timing and frequency of tours, group size, and access routes could have long-term, moderate adverse impacts on solitary wildlife species. Establishing visitor use in the east canyon area would result in long-term, minor adverse cumulative impacts to the Walnut Canyon ecosystem. The area impacted by NPS facilities and visitor use would increase from 5% to an estimated 7% of the total area within the monument. The remaining area within the monument would be formally recognized as a Resource Preservation Zone, which would have long-term, moderate beneficial impacts to natural systems and processes. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
Threatened, Endangered, and Sensitive Species	<p>There are six threatened/sensitive plant species and six threatened/sensitive animal species that are either known or could potentially occur within the monument. Vegetation and wildlife habitat would continue to recover from historic land uses. Monitoring programs are needed to routinely assess the distribution and status of sensitive species, and to ensure they are not impacted by visitor use and NPS operations. Approximately 95% of the area within the monument remains closed to general public access. The backcountry closure effectively protects most sensitive plant and animal species habitat, including all designated critical habitat for the Mexican spotted owl. Current NPS operations and visitor activities would remain concentrated in a relatively small area around the north-central canyon rim. No plant species of concern are known to occur within existing developed or visitor use areas, but <i>Hedeoma diffusum</i> occurs in nearby canyon rim habitat and experiences the greatest risk of</p>	<p>Under Alternative 1, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Proposed new facilities in proximity existing facilities in the north-central canyon area would likely have no adverse impacts to threatened, endangered, or sensitive species. The cumulative effect of proposed new road, trails, and dispersed hiking areas would result in sustained daytime human presence and increased ambient noise along most of the north canyon rim, which would cause a disturbance to sensitive wildlife species within the adjacent narrow canyon. Approximately 80% of the area within the monument area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. This would effectively preclude most disturbance to Mexican spotted owl critical habitat, riparian habitat within the canyon bottom, densely forested canyon terrain, and remote cliff faces. Under Alternative 1, sensitive species would be</p>	<p>Under Alternative 2, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Continued NPS operations and visitor activities in the north-central canyon area would have negligible impacts to threatened, endangered, or sensitive species. The proposed new visitor center and parking area near I-40 are not in proximity to known sensitive species locations or preferred habitats, and would likely have negligible impacts to threatened, endangered, or sensitive species. Closure of the 1996 western boundary area to existing recreational activities would likely have beneficial impacts to sensitive wildlife species known to inhabit the western canyon area. Sensitive plant species within the proposed Extended Learning Zone, northeast canyon rim access road, and the Guided Adventure Zone in the east canyon area would be surveyed and avoided. Potential adverse impacts to sensitive wildlife species within the proposed Guided Adventure Zone in the</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	impacts from current visitor use. Sensitive plant species that are restricted to riparian habitats may be experiencing long-term declines as a result of the creation of Upper and Lower Lake Mary, but long-term monitoring data would be needed to reliably assess trends. Other cumulative effects could result from exceeding visitor carrying capacity within the monument and from nearby development within the town of Flagstaff. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.	surveyed and monitored more intensively, and mitigating measures would be adopted to effectively protect them and their habitats within Walnut Canyon National Monument. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.	eastern canyon area would be mitigated by continued closure of the monument at night, restricting visitor entry unless accompanied by NPS staff, monitoring for potential visitor use disturbance impacts, and establishing seasonal closures during breeding seasons. Approximately 93% of the area within the monument would be formally recognized as a Resource Preservation Zone, and unauthorized entry would be prohibited, effectively precluding most disturbance to critical habitat for the Mexican spotted owl. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.
Wetlands, Floodplains, and Riparian Resources	Under the No-Action Alternative, continued NPS operations and visitor uses would have negligible impacts to wetland, floodplain, and riparian resources within the Walnut Canyon watershed. Fencing the 1996 boundary expansion areas along the canyon floor and closing the area to the general public would likely have negligible impacts, and excluding livestock	Under Alternative 1, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those described for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would	Under Alternative 2, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those identified for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	<p>grazing from the eastern boundary expansion area would likely have long-term, minor to moderate beneficial impacts. The historic Santa Fe dam would likely have negligible impacts because most storm flows pass through the dam's spillway. The greatest impacts to wetland, floodplain, and riparian resources are attributable to cumulative impacts from upstream impoundments of Walnut Creek at Upper and Lower Lake Mary. Stream geomorphic processes, localized wetlands, and riparian vegetation would continue to experience a long-term decline in response to the cessation of seasonal flows. A few obligate wetland and riparian plant species might become extirpated from the monument. The impoundments have also altered flood stages and floodplain areas, and a dam failure would cause catastrophic damage to riparian resources within the monument. Continued disruption of flows within the watershed would have long-term, moderate adverse cumulative impacts to wetland, floodplain, and</p>	<p>also have negligible impacts, as with the No-Action Alternative. The proposed new facilities along the existing entrance road would be entirely within an upland environment and also would have negligible impacts to wetlands, floodplains, and riparian resources. Approximately 2 miles of road would be built along the northeast canyon rim and would cross tributary drainages of Walnut Canyon. Frequent vehicle use along the new road could potentially introduce trace amounts of non-point source pollution from motor and exhaust residue into the Walnut Canyon watershed. The proposed road would likely have negligible to long-term, minor adverse impacts on riparian resources. Dispersed guided hiking would occur in 1/2 mile of riparian corridor along the east canyon floor, increasing disturbance to stream banks, terraces, and riparian vegetation. This impact would probably be offset by fencing the 1996 boundary to exclude livestock grazing. Visitor use within this area would likely result in negligible to long-term,</p>	<p>also have negligible impacts, as with the No-Action Alternative. The proposed new visitor center along the existing entrance road would be entirely within an upland environment and also would have negligible impacts to wetlands, floodplains, or riparian resources. An existing primitive road would be upgraded to provide visitor access to the northeast canyon rim. The road would be properly designed to minimize drainage interference, would be used infrequently, and non-point source pollution from motor and exhaust residue would be minimal. The proposed road would likely have negligible impacts. Dispersed hiking would occur in 2 miles of riparian corridor along the east canyon floor, increasing disturbance to stream banks, terraces, and riparian vegetation. This impact would probably be offset by fencing the 1996 boundary to exclude livestock grazing. Visitor access within this area would likely result in negligible to long-term, minor adverse impacts. In addition to those mentioned, there would be other less severe effects as a</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	riparian resources within the monument. Riparian resources within the Walnut Canyon watershed would remain buffered from water quality degradation by surrounding undeveloped forest lands. Much of the land within the watershed could eventually be acquired for development by the city of Flagstaff. This would increase non-point source pollution, and have long-term, minor to moderate adverse cumulative impacts to riparian and wetland resources within Walnut Canyon National Monument. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.	minor adverse impacts. In addition to those mentioned, there would be other less severe effects as a result of implementing this alternative.	result of implementing this alternative.
Ability to Experience Park Resources	The No-Action Alternative would result in moderate benefits for many visitors, particularly those with an interest in cliff dwellings and with the physical ability to walk to them. Recently improved access to the visitor center and its resources represents a major benefit for visitors with physical disabilities and those wishing to examine exhibits and artifacts. Continuation of traditional interpretive	Alternative 1 would result in major benefits to visitors wishing to experience a greater variety of park resources than are available under the No-Action Alternative. Removal of offices from the visitor center would alleviate crowding and create space for new expanded museum exhibits, artifact displays, and indoor interpretive programs for visitors and organized school groups-all	Alternative 2 would result in moderate benefits to visitors wanting a quieter, more educational experience at Walnut Canyon. The visitor center function would be relocated near the I-40 junction; the existing building would be restored to its original Civilian Conservation Corps (CCC) configuration. This would reduce intrusion of modern structures on the natural and

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	<p>programs would provide moderate benefits for all visitors in understanding of park resources and their significance. The ability to enjoy the scenery and a minimally altered environment, and to do so in a relatively quiet, uncrowded atmosphere, would continue as a moderate benefit in the near future, but would be increasingly impacted by expected visitation increases in the future. This alternative would result in minor adverse impacts to visitor experience by continuing to limit access to the full range of park resources, including the opportunity to visit prehistoric sites other than cliff dwellings. Visitors with disabilities would suffer moderate adverse impacts due to continued inaccessibility of most structures and other resources related to park significance. Some visitors will experience minor to moderate adverse impacts from the lack of opportunity to explore beyond the limited developed area now available for public use. In addition to those mentioned, there would be other less severe impacts as a result of implementing this alternative.</p>	<p>major benefits for visitor understanding and viewing of the "real thing." Remodeling of the visitor center would also provide major benefits in accessibility: physical barriers (multiple building levels and stairs) would be resolved to provide full accessibility and exhibits would be designed for use by visitors with a variety of physical and mental impairments. A new scenic drive would provide views of additional cliff dwellings and other types of structures, some relatively undisturbed, which are not available under the No-Action Alternative. This experience would be accessible. Removal of the busy parking lot from the canyon rim and spreading out use along the rim would create a less crowded visitor experience and enhance the ability to hear natural sounds, both moderate benefits. Because all visitors would no longer be confined to the existing developed area, there would be opportunities to experience new scenic views of Walnut Canyon and to enjoy a minimally altered environment, both moderate benefits.</p>	<p>historic scene and enhance views from the rim and from the Island Trail. Other benefits would include ability to hear natural sounds, see a minimally altered environment, and enjoy a less crowded experience throughout the park. The new visitor center would provide space for new museum exhibits, artifact displays, cultural demonstrations, and indoor interpretive programs for visitors and organized school groups. Traditional interpretive programs would continue, and new longer guided tours and hikes would be added to provide moderate benefits. A greater variety of natural and archeological resources would be available via guided tours and/or self-guided trails. These would include the canyon floor, First Fort, the ranger cabin, and other dwellings, in addition to those available under the No-Action Alternative, and would constitute a moderate to major benefit. The new visitor center and its exhibits would be fully accessible to visitors with a variety of physical and mental impairments, and would provide equivalent experiences</p>

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
		Traditional interpretive programs and cultural demonstrations would continue (a moderate benefit), together with new guided tours of the scenic drive and hike to First Fort. This alternative would result in moderate short-term adverse impacts to several aspects of visitor experience during construction and remodeling of the existing developed area, but these would be short term. There would be minor to moderate impacts to personal freedoms and traditional recreational activities resulting from zoning of newly acquired lands and removal of some uses from the park. These impacts would be partially mitigated by increased on-site information on regional recreational opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	for resources which, because of canyon terrain, cannot be made accessible. More features would be accessible than under the No-Action Alternative: the Rim Trail would be improved to provide access at least to the pithouse and pueblo, and a self-guiding trail to the historic ranger cabin would be accessible. These would be moderate benefits. Ranger-led walks to First Fort and into the canyon, however, could not be made accessible. This alternative would result in major adverse impacts to several aspects of visitor experience during construction and remodeling in the existing developed area, but these would be short-term. This alternative would consider reservation and/or shuttle systems if necessary to control visitation numbers. Moderate adverse impacts on personal freedoms could result if such systems were implemented. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
Park Neighbors	Within existing conditions, the management actions of the NPS would provide many beneficial impacts to other agencies, neighbors, and American Indian tribes in terms of cooperative resources management, planning, and visitor uses. Existing conditions would result in only minor impacts to the workload of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning/management efforts. Growth and development of the city of Flagstaff would create moderate, long-term, adverse impacts to other land and resource managers and neighbors, in terms of additional workloads and loss of recreational areas and opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	Management actions in Alternative 1 would provide benefits to other agencies, neighbors, and American Indian tribes in terms of cooperative resources management, planning, visitor uses, and access to traditional cultural resources. There would be only minor impacts to the workload of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning/management efforts. Growth and development of the city of Flagstaff would create moderate, long-term, adverse impacts to other land and resource managers and neighbors, in terms of additional workloads and loss of recreational areas and opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	The loss of access to new lands on the west side of the monument would create moderate long-term adverse impacts to traditional neighborhood uses of that area. The elimination and relocation of the climbing area in the monument would have minor long-term adverse impacts to a very few individuals. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.
Operational Efficiency	The No-Action Alternative would result in no substantial change in the operations of the park. The effects of implementing the No-Action Alternative would be minor to moderate. Most of the major	Implementation of Alternative 1 would have a long-term beneficial impact on operational efficiency. There would be major, short-term impacts resulting from the construction of a new visitor center and	Alternative 2 would have a long-term beneficial effect on operational efficiency. There would be major, short-term adverse impacts resulting from the proposed construction of a new administrative building

Table 3: Summary of Major Impacts

	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	roads providing access to the park would likely see an increase in visitor and commuter traffic, which would result in additional congestion and a likely increase in accidents. Maintenance needs would increase. Increased use of all roads leading to the park would compound the difficulties that already exist in protecting park resources, including entry to areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources. The effects to facilities, utilities, and staffing would be minor to moderate. Without improvement to the facilities or utilities, conditions would worsen. Limitations on current staff levels inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	parking lot, rehabilitation of the old visitor center, construction associated with the road to First Fort, and access and trail improvements necessary for the increased visitor uses on the western and eastern portions of the park. However, following construction, there would remain only minor to moderate impacts on operational efficiency. Most impacts would be in the form of increased maintenance needs for facilities and trail systems and increased resource protection and preservation needs. This alternative would not fully address the inadequacies with the existing visitor center and parking lot; however, it should improve the work environment for the park staff. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.	and parking lot, and existing visitor center rehabilitation. However, following construction and rehabilitation, there would be only minor to moderate adverse impacts on operational efficiency. Most impacts would occur in the form of increased maintenance requirements for facilities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
1. Maximize Protection of Cultural Resources	Walnut Canyon is operated as a day-use area, and the visitor center parking area is closed and gated at night. The monument boundary was expanded in 1996 to include approximately 1,300 additional acres. Areas not designated and identified for public activities are closed to unguided entry.	The park road would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Parking and orientation would be redesigned and relocated away from the canyon rim. New wayside exhibits at the I-40 pullout/turnaround would better orient and prepare park visitors before they encounter park resources. Areas of the park not zoned for administrative or visitor use would be closed to protect resources.	The existing entrance road and parking area would be retained and used as they are now unless crowding increases to the point that resources are degraded. Then actions would be taken to control visitor numbers. Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road. A new visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources. The modern additions to the existing historic CCC- constructed visitor center would be removed, making the building less visible on the rim and restoring the small, intimate nature of the historic structure. Areas of the park not zoned for visitor or administrative uses would be closed to protect resources.
2. Maximize Protection of Natural Resources	Walnut Canyon is operated as a day-use area, and the visitor center parking area is closed and gated at night. The monument boundary was	The park road would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Parking and	The existing entrance road and parking area would be retained and used as they are now unless crowding increased to the point that resources are

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	expanded in 1996 to include approximately 1,300 additional acres. Areas not designated and identified for public activities are closed to unguided entry.	orientation would be redesigned and relocated away from the canyon rim. New wayside exhibits at the I-40 pullout/turnaround would better orient and prepare park visitors before they encounter park resources. Areas of the park not zoned for administrative or visitor use would be closed to protect resources.	degraded. Then actions would be taken to control visitor numbers. Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road. A new visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources. Areas of the park not zoned for visitor or administrative uses would be closed to protect resources.
3. Expand Diversity of Visitor Experience	Orientation and interpretation are accomplished primarily through the visitor center and the self-guided Island and Rim Trails. Various interpretive programs, including guided hikes to the historic ranger cabin and additional cliff dwellings, are offered as staffing permits. Access is limited to established trails, roadways, and developed facilities.	The existing entrance road and picnic areas would remain, but parking and orientation would be redesigned and relocated away from the canyon rim. New wayside exhibits at the I-40 pullout/turnaround would better orient and prepare park visitors before they encounter park resources. The existing visitor center would be remodeled to allow more space for visitor orientation, new exhibits, and group presentations. An existing primitive road would be substantially upgraded to provide a new scenic drive along the north rim. Initially, this	The existing entrance road and parking area would be retained and used as they are now unless crowding increased to the point that visitor experiences are degraded. Then actions would be taken to control visitor numbers. A new visitor center and parking area would be built near I-40 at the park entrance, to orient visitors before they encounter park resources. The CCC portion of the visitor center would be adaptively used for both trailhead and canyon orientation and as an educational center for in-depth learning opportunities, such as

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
		<p>would be a semiprimitive guided experience until improvements to existing dirt roads could be accomplished. Additional orientation media would be installed at the new parking area near the existing visitor center to alter visitors to the diverse experiences available (walking, driving, biking, guided hikes). In addition to the existing visitor center, self-guided trails and ranger-led hikes, guided access to the recently acquired First Fort archeological area would be possible via the new rim road. Additional guided activities would occur in areas of the north rim. Interpretation and new wayside exhibits along the entrance and rim roads would provide the opportunity to learn about different aspects of the park and its place in the regional story. Hiking, biking, and horseback riding would occur on existing roads and trails on the rim, in the western portions of the newly acquired land.</p>	<p>ranger talks, special events, workshops, seminars, and demonstrations. Within the Extended Learning Zone, self-guided trails and ranger-led activities in the vicinity of the current visitor center would remain as they are now. The potential exists to develop self-guided activities using existing primitive roads to the ranger cabin area. Efforts would be made through development of new media to provide a broader range of educational and interpretive programs aimed at in-depth learning. Some of these experiences would be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies. Visitors would have access to the eastern end of the park via ranger-guided hikes.</p>
4. Limit Effect on Neighbors	Walnut Canyon is operated as a day-use area, and the visitor center parking area is closed and gated at night. FR303 and	The park road would remain day-use only, with the road gated at night at the intersection of the entrance	The existing entrance road and parking area would be retained and used as they are now unless crowding increases to

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
	other U.S. Forest Service roads allow ungated, 24-hour access to USFS lands surrounding the monument.	road and FR303.	the point that visitor experience and/or resources are degraded. Then actions would be taken to control visitor number (such as a shuttle system). Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road while allowing 24-hour use of FR303. An existing USFS road would be upgraded to accommodate ranger-guided hikes in the eastern end of the monument. A parking lot would be established within the monument from which the guided hikes would be staged. Hiking, biking, and horseback riding would be directed to nearby forest lands, where such experiences are already available.
5. Improve Operational Efficiency	The NPS and USFS work cooperatively in the areas of law enforcement, wildland fire, resource protection and management, interpretation, and facility management. Walnut Canyon is operated as a day-use area, and the visitor center parking area is closed and gated at night.	The park would remain day-use only, with the road gated at night at the intersection of the entrance road and FR303. Offices would be removed from the visitor center. New administrative offices would be constructed near the new parking lot. A new pullout and/or turn around would be constructed near the I-40 exit,	A new fully accessible visitor center and parking area would be built near I-40 at the park entrance, to orient visitors and to collect entrance fees. Three gates would be located along the entrance road: one near the I-40 exit and one on each side of FR303, to eliminate after-hours access to the monument road. Some visitor experiences would

Table 4: Objectives Met by Alternatives

Objective	No-Action Alternative: Existing Conditions	Alternative 1: Diversify Opportunities for Visitor Use	Alternative 2 (Preferred): Emphasize Preservation
		and might include an entrance/fee collection facility.	be provided through partnerships with affiliated tribes, organizations, institutions, and/or other agencies. An existing USFS road would be upgraded and used administratively to facilitate ranger-guided hikes in the eastern end of the monument. A parking area would be established in the monument from which guided hikes would be staged.

AFFECTED ENVIRONMENT

LONG-TERM INTEGRITY OF ARCHEOLOGICAL RESOURCES

Impact topics were identified through the scoping process. Concerns covered by this section include maintaining the long-term scientific integrity and culturally sensitive values of archeological sites, including prehistoric and historic architecture, shrines, cultural modified landforms, agricultural field systems, rock art, and other cultural features.

Region

The high arid Colorado Plateau region of the American Southwest is world-renowned for its abundant, well-preserved archeological resources. Archeological remains in the region reflect several distinct lifeways and adaptive strategies, including hunting and gathering, horticulture, livestock grazing, and, after the mid-19th century, participation in the Euro-American global economy.

The forested area surrounding Walnut Canyon National Monument contains hundreds of archeological sites. A few of these sites date to the late Archaic period, ca. 2500 B.C.-A.D. 1, but most of the sites and associated artifacts are the tangible remains of a prehistoric farming culture that flourished in the Flagstaff region from about A.D. 600 until 1400. Archeologists call this culture "Sinagua," in reference to the early Spanish name for this highland region, "Sierra Sinagua" (Mountain Range without Water).

Scattered Sinagua families cultivated the upland areas around Walnut Canyon for centuries, growing small gardens of corn, squash, and beans. Early settlers lived in subterranean pit structures, but by the early 1100s, most habitations included at least some aboveground structures. During the 1100s in the Walnut Canyon area, there was also a notable shift toward living in cliff alcoves. By the mid-1100s, a large segment of the local Sinagua population had moved into limestone alcoves below the canyon rim, where they constructed substantial dwellings with locally available stone and clay. Growing crops at scattered plots in the surrounding forest, raising children, making stone tools and other implements, and following the ancient ceremonial cycles that had been passed down for generations, the Walnut Canyon community thrived for about 150 years.

Population in the Flagstaff region peaked in the mid-1100s through early 1200s, coincident with the peak occupation of Walnut Canyon, but it declined precipitously in the following century. By the early 1300s, the Sinagua had moved out of Walnut Canyon, presumably to Anderson Mesa or points farther south and east, although their Pueblo descendants continued to visit the area for hunting, gathering, and ceremonial purposes. During the following centuries, the area around Walnut Canyon was also visited by ancestors of the Yavapai and Havasupai, and after the 1700s by Apache and Navajo, for seasonal hunting and gathering.

Today, Walnut Canyon preserves a portion of the once extensive Sinagua cultural landscape. Multiroom residential sites (both cliff dwellings and open-air pueblos), isolated field structures, "forts," quarries, agricultural fields, check dams, shrines, rock art, and other features are now protected within the monument.

Park

Walnut Canyon National Monument on the southern edge of the Colorado Plateau was specifically created to preserve and interpret some exceptional prehistoric archeological sites. The primary archeological remains of Walnut Canyon are unique, in that the monument preserves the only known concentration of northern Sinagua cliff dwellings in the region. These well-preserved architectural sites, situated in alcoves below the canyon rim, were constructed by the Sinagua primarily between A.D. 1100 and A.D. 1250. In addition, this monument contains a representative cross section of the types and variety of archeological sites found throughout the Four Corners area, including small and large masonry pueblos, rock shelters, open campsites, agricultural field systems, ceremonial shrines, historic cabins, rock art panels, miscellaneous artifact scatters, and a variety of other physical remains reflecting the diverse cultures and economic strategies of the various people who have attempted to make a living in this beautiful yet challenging environment.

The site density in the monument averages almost 100 sites per square mile, compared with typical densities of 40 sites per square mile in other areas of the ponderosa pine forest near Flagstaff. The high site density in

Walnut Canyon reflects the area's biological richness. The canyon's natural abundance and diversity of plant and animal species provided a storehouse of resources that attracted and sustained the prehistoric inhabitants of Walnut Canyon.

About 45 percent of the approximately 3,600 acres in Walnut Canyon National Monument have been intensively inventoried for archeological resources. All of the inventoried areas are within the old (pre-1996) boundaries of the monument. Areas that have been specifically inventoried for archeological resources include the fence line along the entrance road, the north and south rim areas, plus approximately half of the inner canyon zone. None of the private inholding (approximately 291 acres), or any of the new lands added to the monument in 1996, have been surveyed for archeological resources. A total of 251 archeological sites have been recorded within the inventoried areas. Of this total, 87 are classified as cliff dwellings. In addition, the monument includes 5 "forts" (walled, defensible sites located on promontories within the canyon), 5 lithic scatters, 87 one- and two-room field houses (some with associated field complexes), 18 pithouses, and 11 multiroom pueblos. Several historic sites (a cabin, a dam, plus several trash dumps) are also present in the monument.

The dense concentration of prehistoric ruins, their exceptional state of preservation, and their unusual and highly scenic setting in sheltered alcoves along the canyon walls, coupled with the threat of imminent destruction by commercial looters and misguided tourists, were key factors influencing the creation of

Walnut Canyon National Monument in 1915. These original core values persist to the present day. Approximately 40 of the 251 archeological sites in the monument have been stabilized to some degree, in order to withstand impacts from visitation and weathering, but many still retain a high degree of integrity, including substantial amounts of original masonry architecture and a more or less complete assemblage of artifacts.

HISTORIC CHARACTER OF THE BUILT ENVIRONMENT

Region

The historic built environment of the region has been shaped, like many small Western towns, by timber, cattle grazing, and the mining industry (Cline 1994). A few grand homes survive in the area, which were constructed by Flagstaff's first entrepreneurs of the late 19th century. The majority of structures built during Flagstaff's early days represent the working class. Areas like Milton (mill town) housed mill workers and their families (Cline 1976).

Science and education also shaped the historic built environment of the region. In 1894 Flagstaff was chosen as the site for Lowell Observatory, and in 1899 Northern Arizona Normal School (now Northern Arizona University) opened as a preparatory school for teachers.

The Civilian Conservation Corps (CCC) added much to the region, constructing roads, trails, fences, phone lines, and a golf course clubhouse in Flagstaff (Cline 1994).

The landscapes of the region are many and span great lengths of time.

Landscapes from the prehistoric Sinagua culture overlap with other prehistoric groups, including the Kayenta Anasazi and Cohonina. Melded in this region are natural features and cultural elements shared by historic Navajo and Paiute groups, early cattle and sheep ranchers, and lumbermen.

Park

There are three historic periods of construction at Walnut Canyon National Monument. Visitors experience each of these episodes via interpretive guided walks or self-guided tours. Except for the ranger cabin, however, the structures are not interpreted specifically for their historic value.

The ranger cabin was constructed in 1904 as a ranger station/residence by the San Francisco Mountain Reserve (later the Coconino National Forest). The cabin remains intact but in poor condition. Associated with the cabin are overgrown garden beds, one fruit tree, an outbuilding, and a cistern. A fire lookout tree is some distance from the cabin. Remnants of early camps left by visitors and other forest users are still present throughout the monument.

The second era of major construction at the park is represented by rustic architecture constructed by the Civilian Conservation Corps (1938-1940). A complex of buildings was constructed, including two ranger residences and an associated outbuilding, visitor center, and associated rest rooms. The Island Trail (primary interpretive area in the park) was constructed during this time. Each of the buildings was constructed from material quarried on-site-typical of rustic architecture that dominated NPS design in the 1930s and 1940s. A

split rail fence was also constructed by the CCC to prevent cattle from straying into the park along FR303.

Walnut Canyon's CCC structures "reflect an architectural theme based on native materials and methods for construction and sometimes a cultural theme drawn from the region's pioneering or indigenous architecture" (McClelland 1998). Buildings were designed to fit with the natural character of the park. The visitor center and housing complex at Walnut Canyon reflect the desire for the buildings to harmonize with the surrounding environment.

The third era of major construction at Walnut Canyon was the Mission 66 program, during which two houses and an addition to the CCC visitor center were constructed. Exhibits in the visitor center were also developed during this period and have changed little since. In the mid-1970s a peaked roof was added to the CCC and Mission 66 portions of the visitor center. In 1996 an addition was constructed to the Mission 66 portion to provide more room for cooperating association book sales.

The visitor center and houses constructed during the Mission 66 program represent an era of modern methods of landscape and architectural design. Well-known architect Cecil Doty designed the Mission 66 portion of the visitor center. It reflects the Mission 66 concept of open design, wide floor-to-ceiling windows, and light-controlled areas for displaying artifacts.

The majority of visitors to Walnut Canyon enter the Mission 66 portion of the visitor center and walk the nearby Rim and Island Trails. The visitor center and trails can be

congested at times, and efforts have been made to modify the building to accommodate all visitors. Impacts (building additions, installation of wheelchair lifts) to the visitor center are the direct result of increasing numbers of visitors and the design limitations of the building. A general Service-wide moratorium has been placed on major changes to structures built during the NPS Mission 66 era, but in the Intermountain Region this has been modified to include review by a Mission 66 review board.

Proposed changes are reviewed by the board, and a determination to proceed with construction can be granted, based upon criteria (e.g., the significance of the structure, how any character defining features of the structure would be affected, and whether or not the work would be done in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties). In addition, the eligibility of Mission 66 era structures for listing in the National Register of Historic Places can be determined by the review board prior to completion of the context study.

Cultural landscapes at Walnut Canyon have never been identified. A cultural landscape inventory (CLI) needs to be conducted to identify issues such as historic land uses and the location and character of significant resources. A CLI is needed to avoid adverse effects and/or loss of unidentified landscapes.

LONG-TERM INTEGRITY OF ETHNOGRAPHIC RESOURCES

NPS guidelines describe ethnographic resources as "variations of natural and standard cultural resource types. They are subsistence and ceremonial locales

and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users. The decision to call resources 'ethnographic' depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their lifeways. When natural resources acquire meaning according to the different cultural constructs of a particular group, they become ethnographic and thus cultural resources as well" (NPS 1997).

Region

Walnut Canyon National Monument in north-central Arizona is part of a region lying between extensive high-altitude national forest lands to the southwest and semidesert mesas of the Hopi and Navajo Indian Reservations to the northeast. The latter forms the largest block of Indian tribal lands in the United States, including more than 25,000 square miles. These contemporary reservations are only a small portion of the customary lands occupied aboriginally and historically by the tribes, and to which the tribes retain deeply rooted traditional associations. The three Flagstaff Area monuments are an integral part of this larger traditional landscape. Many of the geographic features and natural and cultural resources identified by the tribes as culturally significant within the three monuments are historically or ceremonially interconnected with other landscape elements, geographic features, and archeological sites throughout the tribes' entire customary land bases. In addition to the Hopi and Navajo Tribes, who currently occupy the tribal lands adjacent to or near the monuments, many of the other tribes originally consulted early in the GMP planning

process retain customary associations with many of the same resources and places throughout the region. A good literature-based overview of tribal associations with the Flagstaff Area monuments and surrounding region can be found in Brandt (1997).

Park

As described in the Purpose and Need and Consultation/Coordination sections, NPS consulted with many tribes in identification of ethnographic resources. The Hopi, Zuni, and Navajo Tribes conducted field research, using culturally appropriate methods to identify ethnographic resources about which they might have concerns in the context of the GMP. Although tribal representatives identified those resources of particular concern, it should be stressed that the resources identified for this project are not necessarily all the ethnographic resources that exist in the park.

The Navajo Nation identified fourteen culturally significant plant species at Walnut Canyon, in addition to white clay, a culturally significant mineral. The Hopi Tribe and Pueblo of Zuni identified the archeological resources in Walnut Canyon, including pre-Columbian architectural remains and petroglyphs, as part of their traditional histories and contemporary cultural identities.

LONG-TERM INTEGRITY OF NATURAL SYSTEMS AND PROCESSES

The integrity of the natural systems and process within Walnut Canyon National Monument depends on conserving native plant communities, preserving unfragmented wildlife habitats, maintaining natural

geomorphic and soil formation processes, and ensuring that intermittent drainage systems function properly. The monument is a very small natural area within a regional framework of lands that are primarily managed by the U.S. Forest Service for ecologically sustainable, multiple uses. Preserving the integrity of the monument's natural systems requires close coordination with the Coconino National Forest to ensure that the full complement of plant and wildlife species within the monument is conserved. During the public and agency scoping process, specific environmental impact issues were identified, including: restoring fire-dependent ponderosa pine "park lands" above the canyon rim, preserving regional movement corridors and seasonal habitats for wildlife, including: elk, deer, pronghorn antelope, wild turkey, black bear, and mountain lion; protecting plant species diversity and the locally rich assemblage of plant communities; healthy function of tributary canyon watersheds; maintaining the integrity of natural systems for ecological research; and excluding nonnative species. Additional summaries of affected threatened/endangered/sensitive species and wetlands/floodplains/riparian resources are presented in separate sections below.

Region

Walnut Canyon National Monument is located along the southern margin of the Colorado Plateau biotic province. In the Mogollon highlands-Coconino Plateau region surrounding the monument, elevations vary from a low of 2,400 feet above sea level at the bottom of the Grand Canyon, to a high of 12,670 feet above sea level at

the San Francisco Peaks. The region has been shaped by erosion to reveal geologic outcrops of red sandstone and white limestone. The area surrounding the monument is also characterized by an extensive volcanic field (the San Francisco Volcanic Field) with prevalent cinder cones and lava flows. The Painted Desert stretches east within the Little Colorado River Basin toward Petrified Forest National Park. Soil types also vary within the region, depending on whether they are derived from weathered limestone, sandstone, shale, or volcanic bedrock. Unique areas of relatively young, deep cinders are also present, where soils are still forming and vegetation is colonizing.

The regional climate varies tremendously with elevation above sea level. Walnut Canyon National Monument, at 6,900 feet elevation, receives approximately 20 inches of precipitation per year, and temperatures typically range from near 0 in winter to the mid-90s in summer. Thirty miles to the northeast, the Little Colorado River Basin at 4,500 feet elevation typically receives fewer than 7 inches of precipitation per year. Winter daytime temperatures are typically warmer than they are in Flagstaff, and summer temperatures may exceed 100. Above 10,000 feet on the adjacent San Francisco Peaks, annual precipitation exceeds 40 inches, temperatures are considerably cooler, and the growing season is remarkably shorter.

The remarkable combination of geologic, elevation, and climatic differences within a relatively small geographic area has contributed to a considerable diversity of vegetation. This diversity is exhibited by the range of plant communities from alpine

tundra on top of the San Francisco Peaks to Sonoran Desert at the bottom of the Grand Canyon. Within Walnut Canyon, Sunset Crater Volcano, and Wupatki National Monuments surrounding Flagstaff, one can observe many of the dominant vegetation types. Walnut Canyon contains a narrow stand of broadleaf deciduous forest along the bottom of the canyon, mixed-coniferous forest on north-facing slopes, and ponderosa pine forest and parkland above the canyon rim, respectively. Traveling a short distance to Sunset Crater Volcano, one passes through expansive ponderosa pine forest, high elevation meadows, and recent volcanic lava flows and cinder barrens. As one descends in elevation to Wupatki, juniper woodlands, Colorado Plateau grasslands, and Colorado Plateau desert scrub communities are common. The highest elevations in the neighboring San Francisco Peaks harbor aspen groves, and spruce and fir forests.

Prehistoric, historic, and current land uses have undoubtedly played a major role in shaping the landscape of the area as well. In addition to relying heavily upon agricultural land use, prehistoric peoples used native plants and animals, and used fire to modify the environment. Regional Navajo sheepherding dates to the period of Spanish settlement of the Southwestern United States. A number of tribes, including the Navajo and the Hopi, continue to use plants, animals, and other natural resources in the region.

Fire has played a major role in shaping the vegetation in the Southwestern United States. In the past, low-intensity, lightning-ignited fires frequently burned the forest understory to maintain open pine

stands with diverse grass and wildflower cover between the trees. Fire suppression for more than a century has caused well-documented changes within forests and grasslands of the region. Tree densities have risen dramatically, and forests are now at risk from intensely hot, catastrophic fires.

Historic and modern influences, including logging, agriculture, cattle ranching, hunting, mining, fire suppression, community development, and road and utility construction have together greatly affected and fragmented regional natural systems and processes. Ecologists theorize that ranching activity and grazing pressure caused or contributed to a wide range of historic changes in ecosystems throughout the Southwestern United States, including: loss of grassland cover and plant species diversity; reduction or extirpation of grassland-dependent wildlife; extirpation or extinction of predators; accelerated soils erosion and gulying of intermittent drainage systems; decreasing wildfire size and frequency; and loss of cottonwood-willow riparian vegetation, which has had significant adverse impacts to both migratory and breeding birds, and development of artificial water sources and alteration or elimination of natural surface waters for native plant and animal species. Grazing also favors the establishment of nonnative species. Environmental changes may be more apparent at lower elevations, where there is a documented increase in desert vegetation and noxious plants. Ranching and cattle stocking rates are changing as a result of widespread concerns over these impacts. Even though many of the changes to regional natural systems are likely permanent, ranching activity is trending more toward long-term

ecological sustainability within the region.

Juniper woodland has been rapidly expanding into grasslands during the last century, but the underlying causes are the subject of scientific debate. Many ecologists believe that cattle grazing, in combination with range-fire suppression, is favoring juniper encroachment into grasslands. Cattle remove much of the grass and forbs and enhance the ability of juniper seedlings to germinate and establish in what were once continuous grassland areas. Other scientists believe that we are witnessing a natural succession process in which junipers are returning to formerly occupied habitat. Human occupation of much of the region certainly must have included the use of any available wood sources for fuel and construction purposes.

Modern landownership patterns and uses have also resulted in increased habitat fragmentation within the region. Fences, especially double-fenced highway rights-of-way, prevent the regional movement of numerous wildlife species, including pronghorn antelope. Roads throughout the area serve as conduits for the spread of exotic weedy plants. Much of the land within the region is managed by the U.S. Forest Service for sustained multiple uses, including hunting, firewood collecting, grazing, off-highway vehicle use, backpacking, and hiking. A large area of the region belongs to sovereign American Indian tribes. Their cultures are traditionally tied to their lands, but little information is generated or available to understand the environmental impacts of tribal land management.

Large areas of arid lands within Southwestern United States have been invaded by nonnative plant

species. On the Colorado Plateau, much of the remaining grasslands have been extensively invaded by nonnative annual brome grasses, drastically altering natural fire regimes, displacing native perennial bunchgrasses, and reducing or eliminating forage or cover for grassland-dependent wildlife species. Riparian vegetation has been severely altered by tamarisk invasion, which has outcompeted most native cottonwood and willow stands, and particularly affected both migratory and breeding birds.

Park

Approximately six miles of Walnut Canyon are encompassed within the 3,000-acre area of the monument. The land surface ranges from 6,200 feet to 6,900 feet above sea level. The canyon trends from west to east, following the sinuous, entrenched meanders along the Walnut "Creek" drainage. It is typically 1/4 mile wide from north rim to south rim, 400 feet deep at the western (upstream) boundary, and 250 feet deep at the eastern (downstream) boundary. The canyon walls are nearly vertical slickrock throughout most of the monument. Above the canyon rims are level terraces. Three prominent tributary side canyons enter from the south side and another enters from the north side near the western monument boundary.

The geology of Walnut Canyon is not complex, and is described and mapped by Darton (1910), Vandiver (1936), and Benfer (1971). The canyon is eroded into sedimentary rock layers of the Kaibab Limestone and Coconino Sandstone formations. The drainage of Walnut Creek became entrenched in the canyon as the formations were locally uplifted. More recent volcanic events within

the San Francisco Volcanic Field have influenced the drainage pattern of Walnut Canyon and surrounding canyons (Colton 1936).

Despite its relatively small area, Walnut Canyon National Monument harbors a rich flora and assemblage of vegetation types. Inventories of the flora of the pre-1996 monument area have documented more than 400 species (Arnberger 1947, Spangle 1953, Joyce 1974, Jenkins et al. 1991, National Park Service 2001). The vegetation of the pre-1996 monument area was surveyed and mapped in 1991 (Jenkins et al.). Surveys of riparian vegetation along the canyon bottom drainage were completed by Brian (1985) and Phillips (1990). In addition, a new vegetation classification map is being completed by the USGS Biological Resources Division (Thomas 2001). A study of plant macrofossils found in packrat middens determined to be 3,800 years old was completed by Murdock (1994). A study reconstructing the forest vegetation circa 1880 for the north canyon rim area was completed by Menzel (1996). Land use histories are summarized in Bremer (1988) and Menzel (1996). Studies of the fire history within the monument are available for ponderosa pine forest (Davis 1985, Swetnam et al. 1990) and pinyon-juniper woodland (Despain and Mosley 1990). In addition, a network of vegetation study plots has been installed to assess the effects of prescribed burning (Schon 2000).

The monument area is dominated by coniferous forest and woodland vegetation. The north-facing canyon slopes and tributary canyons are more shaded and moist, and are dominated by Douglas fir-Gambel oak forest. The south-facing slopes are more arid, and dominated by pinyon and juniper

trees, a diverse array of shrubs and herbaceous species, and even cacti and succulents. The narrow canyon floor harbors a strand of riparian vegetation dominated by broadleaf deciduous trees and shrubs. The terraces above the canyon rim are dominated by ponderosa pine forest. The eastern (downslope) end of the rim terraces are generally more arid, and ponderosa trees give way to pinyon-juniper woodland and open grassland.

For a relatively small area, Walnut Canyon National Monument also harbors a rich assemblage of wildlife habitats. Checklists have been prepared for mammals (Salomonson 1973) and birds (Grater 1935, Wetherill 1937, Spangle and Spangle 1954, Haldeman and Clark 1969). Scientific surveys of the canyon fauna are generally lacking, but observation records confirm that much of the inherent faunal diversity of the canyon is intact. Wildlife habitats and migration corridors have remained relatively undisturbed under historic regional management conditions. This is largely attributed to the ruggedness of the canyon terrain, heavy vegetative cover, and reliable surface waters. The long-term closure of the backcountry area within the monument has also minimized human presence and noise disturbance of solitary wildlife species.

Observations by the NPS, Arizona Game and Fish Department, and U.S. Forest Service confirm that Walnut Canyon harbors an important wildlife migration corridor and seasonal habitat for elk, mule deer, and pronghorn antelope. Large predators, including mountain lions and black bear, also frequent the area. The south side of the canyon provides habitat for wild turkey. The steep

terrain and secluded side canyons provide favorable habitat for numerous raptor species, including Cooper's hawk, sharp-shinned hawk, red-tailed hawk, golden eagle, prairie falcon, flammulated owl, and great grey owl. In addition, the Mexican spotted owl, peregrine falcon, and northern goshawk, among the rarest of raptor species in the Southwestern United States, are residents of Walnut Canyon.

The canyon's natural system and processes were no doubt heavily influenced by the Sinagua Culture until they abandoned the area during the 13th century. During historic time, vegetation and wildlife within the Walnut Canyon watershed have been heavily influenced by former logging and timber management, wildfire suppression, game hunting, and predator control. The northern boundary of the monument is surrounded by a "checkerboard" pattern of sections of Coconino National Forest and Arizona State lands, while the southern boundary is dominated by the Coconino National Forest. The easily accessible forests adjacent to the north canyon rim were heavily cut over between 1880 and 1925, and a series of salvage cuts was conducted during the 1960s. The terrain south of the canyon rim is much less accessible and was not extensively logged until the 1970s. Livestock grazing continued within the monument on the canyon rim areas until the boundary was fenced in 1973. Cattle grazing continues in several grazing allotments on the Coconino National Forest within the Walnut Canyon watershed.

Fire history and presettlement forest reconstruction studies have shown that the ponderosa pine forest along the north rim has changed

considerably during the last century. Prior to 1890, the north rim forest experienced a fire every 4 to 8 years, and the forest was composed of fewer, larger pine trees clustered in isolated stands with an open understory of diverse grasses, wildflowers, and forbs. Today, as a result of logging the old-growth trees, wildfire suppression, and loss of the herbaceous understory due to overgrazing, the forest is dominated by numerous younger, smaller trees and a mid-story of woodland species such as Gambel oak, pinyon, and juniper. The dense pine and woodland canopy is shading out the rich understory flora. Beginning in 1990, the NPS implemented a management-ignited fire program to restore presettlement ponderosa pine forest conditions on the canyon rim terraces. Preliminary results from fire effects monitoring plots show effective reductions in ponderosa seedlings and saplings, junipers, deadwood, and the ground litter layer. The program was implemented under a series of fire management plans. The latest plan recently expired and, in order to continue the program, the NPS must prepare a new fire management plan and accompanying assessment of potential environmental impacts.

Except for the documented vegetation changes, NPS management of Walnut Canyon National Monument has generally favored the long-term protection of natural systems and processes. Less than 5% of the monument's approximately 3,600 acres is currently affected by fences, roads, buildings, utilities, and visitor activities. Visitor use areas and NPS support facilities are located on the north-central canyon rim. The entrance road generally lies outside of the main canyon drainage area, and

was designed to minimize interference with local drainage patterns. The road is used mostly during the day while the monument is open to the public, resulting in some traffic and noise disturbance to wildlife. Nighttime use is much more limited, but nevertheless increases the risk of mortality to wildlife, and animals are occasionally killed crossing the road. Visitor use and NPS operation impacts are primarily concentrated around the visitor center and parking area, the Rim Trail, and "Island" Trail, and include localized vegetation trampling, soil compaction, unplanned trail segments, minor disruption of drainage patterns, increased noise, and disturbance to wildlife. The existing eastern boundary fence has been locally modified to accommodate seasonal movements by wildlife, including pronghorn.

Most of the monument area prior to the 1996 boundary expansion has long been closed to public access to protect sensitive cultural resources. The pre-1996 boundary has been surveyed, fenced, and posted as closed. Backcountry access continues for authorized special uses, such as cultural site preservation, research, and educational activities. Occasional unauthorized hiking occurs within the closed area, which is likely to continue because there is insufficient staff to ensure frequent patrols. The lands added by the 1996 boundary expansion have yet to be surveyed, fenced, and posted. These areas continue to receive public uses similar to those under former management by the U.S. Forest Service. Predominant uses include hiking, bicycling, and horse riding. Isolated incidents of off-road driving, wildlife poaching, firewood cutting, and trash dumping are occurring. An active U.S.

Forest Service livestock-grazing lease encompasses the eastern expansion area. These activities will continue to impact natural systems and processes within the monument until the NPS surveys and fences the 1996 boundary expansion areas.

At least 23 species of nonnative plants have dispersed into the monument. Invasive nonnative species directly compete with native plants, and can significantly alter natural plant communities and wildlife habitats. Nonnative species may rapidly colonize areas where the ground surface is heavily disturbed by equipment or constant foot traffic. Within the monument, populations of cheatgrass (*Bromus tectorum*), mullein (*Verbascum thapsus*), filaree (*Erodium cicutarium*), horehound (*Marrubium vulgare*), and dalmation toadflax (*Linaria dalmatica*) have infested disturbed areas along road and trail corridors, developed areas, or areas of heavy visitation. Although these species are commonly observed, the monument currently lacks sufficient staff or funding to actively monitor or attempt to control them. Success in controlling invasive plants would be predicated upon early detection of infestations before they grow out of control, or upon the availability of ecologically sound and affordable technology. The best measures to control these species are proactive planning of access routes and ground-disturbing activities to minimize the potential for establishment and spread.

U.S. Forest Service management of the Walnut Canyon watershed has the greatest potential to affect natural systems and processes within the monument. The NPS hopes to alleviate interagency concerns through increased communication,

monitoring ecosystem conditions, and better participation in the U.S. Forest Service planning process. If successful, improved coordination with the U.S. Forest Service could mitigate certain adjacent land use impacts upon natural resources within the monument, including actions such as road closures, fence realignment, and joint fire management near the current monument boundary.

The city of Flagstaff has annexed all lands adjacent to the north and west boundary of the monument. Flagstaff is rapidly growing, and residential development is also occurring on private lands to the northeast of the monument near the communities of Cosnino and Winona. Natural systems and processes within the monument are currently buffered from development impacts by Coconino National Forest and Arizona State lands. However, Flagstaff could eventually acquire and develop these lands. This would greatly increase recreational and illegal impacts to Walnut Canyon, further fragment wildlife habitat, and deter the NPS from using fire to maintain natural vegetation communities.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

This section complements the preceding section on natural systems and processes, and is intended to specifically address compliance with the Endangered Species Act. In addition to legally protected threatened and endangered species, a number of "species of concern" occur within habitats nearby and similar to Walnut Canyon. The status of these species is regularly assessed by regional federal, state, and tribal

agencies. During the public and agency scoping process, pertinent impact issues were identified regarding the conservation of federally listed threatened and endangered species, "species of concern," and designated critical habitats that might be affected by a proposed action. The potential impacts to other identified sensitive plant and animal species and unique habitats are also considered.

Region

The diversity of landscapes and habitats in the region naturally provides for impressive species diversity. Habitats range from alpine tundra on the San Francisco Peaks to Sonoran Desert at the bottom of the Grand Canyon. Old-growth coniferous forests and other vegetation communities in the region, combined with physiographic features such as canyons and mountains, provide habitat for a number of threatened, endangered, and sensitive species. Within Coconino County, Arizona, there are 5 plant, 9 animal (including fish), and 1 invertebrate species that are formally listed as threatened or endangered. There are another 54 plant, 51 animal (including fish), and 5 invertebrate species that may be exceedingly rare and are being monitored by the U.S. Fish and Wildlife Service, Arizona Game and Fish Dept., U.S. Forest Service, and Navajo Natural Heritage Program (Arizona Game and Fish Department 2001).

Among all biological groups, fish are the most threatened. A disproportionate number of rare and threatened plant, animal, and invertebrate species also require perennial streams, wetlands, or riparian habitats, reflecting the

widespread alteration of entire region's freshwater ecosystems.

Of the region's rare plant species, several are endemic to the Mogollon Highlands and San Francisco Mountains, including the San Francisco Peaks groundsel (*Senecio franciscianus*), listed as threatened, and Bebb's willow (*Salix bebbiana*). The Sunset Crater penstemon (*Penstemon clutei*) and cinder lady's tresses (*Phacelia welshii*) are endemic to the volcanic cinder deposits surrounding the San Francisco Volcanic Field. Riparian areas also harbor numerous plant species of concern, such as Navajo sedge (*Carex specuicola*), Alkali grass (*Puccinella parishii*), which occurs at lower elevations in wetter sites north of the Little Colorado River, Mogollon columbine (*Aquilegia desertorum*), which occupies seeps and springs, and alcove bog orchid (*platanthera zothecina*). A number of species, such as the Flagstaff pennyroyal (*Hedeoma diffusum*), inhabit ponderosa pine parklands, and likely depend on fire to maintain an open forest canopy so that sunlight penetrates to the ground. Many species within the cactus family occupy very limited habitats and are sensitive to disturbance, including livestock grazing. Because of their popularity with horticulturists, all cactus species within Arizona are protected under state law.

The threatened Mexican spotted owl (*Strix occidentalis* spp. *lucida*) is found within the region in dense, mixed-conifer forests, particularly in canyons. The U.S. Fish and Wildlife Service recently designated critical habitat for the species. The Southwestern willow flycatcher, an endangered bird species, depends upon very specific riparian habitat conditions along

perennial streams within the region. Relatively large numbers of bald eagles (*Haliaeetus leucocephalus*) winter in the region, especially near Lake Mary, Mormon Lake, and Marshall Lake. Although recently removed from the endangered species list by U.S. Fish and Wildlife Service, the peregrine falcon (*Falco peregrinus anatum*) inhabits steep cliff sites in the region. Even though the species is no longer considered threatened, population levels will continue to be monitored for a period of five years. Other raptors that are considered species of concern include the northern goshawk (*Accipiter gentilis*) and ferruginous hawk (*Buteo regalis*).

Although it is not formally listed or considered a species of concern, wildlife managers and the general public are concerned about the golden eagle (*Aquila chrysaetos*) because of its low population density, ecological importance as a predator and indicator of environmental quality, public concern for its welfare, and traditional importance to American Indians. As with other wide-ranging raptor species, golden eagles have declined as a result of habitat loss, historic predator control programs, and power line electrocution. Eagles are legally protected from being killed or taken under the Eagle Protection Act. The U.S. Fish and Wildlife Service administers this Act, and annually issues permits to American Indian tribes to take specified numbers of golden eagles and feathers for ceremonial use. Golden Eagles are solitary animals, and little is known about their distribution, number, and status within the Colorado Plateau Region. Although the U.S. Fish and Wildlife Service recently proposed a study to assess the status of the species throughout the western

United States, there is no regional management framework for ensuring the species remains viable.

Bat species are considered to have specialized habitat requirements and sensitivity to environmental impacts. Twelve species are currently monitored as species of concern.

Although not formally listed or considered a species of concern, pronghorn antelope (*Antilocapra americana*) are the focus of considerable wildlife management effort because they are attractive, large herbivores and an important game species, and the public is concerned about their continued survival. Wildlife managers are concerned about the decline in the pronghorn population in northern Arizona over the past few decades (Bright and Van Riper III 2000). The species was historically overhunted and nearly extirpated in the Southwestern United States. The continuing decline is primarily attributed to habitat fragmentation caused by conventional range fences, which antelope do not jump over and therefore must find weak sections of fence to cross under. Pronghorn herds are effectively confined and prevented from moving to water and forage during drought years or to lower elevations during severe winters. Other causes of decline include road mortality and continuing loss of open grassland habitat.

Park

Walnut Canyon provides habitat for a few threatened and several sensitive species. The Arizona Heritage Data Management System (Arizona Game and Fish Department 2001) was consulted via the Internet to generate a list of threatened and endangered species, and other "species of

concern" for Coconino County, Arizona. Plant species on the list were compared with the flora summary checklist recently compiled by the NPS (2001). In addition, a survey for special status plants at the Flagstaff Area National Monuments, including Walnut Canyon, was recently completed by Huisinga and others (2000).

Currently, no federally listed threatened or endangered plant species are known to occur in Walnut Canyon National Monument.

One plant species, *Rumex orthonuerus*, currently listed as threatened, occurs in wetland meadows in the Mogollon Highlands southeast of the Coconino Plateau. The species could potentially occur at wetter sites along the Walnut Canyon floor. However, it has not been discovered during numerous botanical inventories of the monument, and likely does not occur because of the relative scarcity of deep soil terraces adjacent to perennial waters.

Although not formally protected under the Endangered Species Act, two plant species of concern occur within the monument-*Aquilegia desertorum* and *Erigeron saxatalis*. Several populations of *Aquilegia desertorum* are documented within the monument. The species inhabits moist soil pockets in rocky limestone terrain. Several populations of *Erigeron saxatalis* are documented within in the monument in riparian vegetation along the canyon bottom.

Another three plant species of concern have not been documented but could potentially occur within the monument-*Cimicifuga arizonica*, *Clematis hirutissima* var. *arizonica*, and *Hedeoma diffusum*. *Cimicifuga arizonica* occurs within the Mogollon

Highlands region in deep, narrow canyon habitats on moist, loamy soil and beneath heavily shaded riparian and coniferous forest canopy cover. This species has not been discovered during several field surveys and probably does not occur within the monument because of the relative scarcity of deep soil terraces adjacent to perennial waters. *Clematis hirutissima* var. *arizonica* occurs in the Walnut Canyon watershed upstream from the monument. The subspecies grows in colonies under shaded forest and woodland vegetation on gentle slopes with well-developed, limestone-derived soils. This subspecies has yet to be discovered during botanical surveys of the monument, but likely occurs because of the presence of good habitat. *Hedeoma diffusum* grows along limestone bluffs in Walnut Canyon, and has been documented near the monument boundary on the Coconino National Forest. This species has yet to be discovered during botanical surveys of the monument, but likely occurs because of the presence of good habitat.

The Mexican spotted owl, peregrine falcon, and northern goshawk are known to inhabit Walnut Canyon. The Mexican spotted owl (*Strix occidentalis lucida*) is federally listed as threatened under the Endangered Species Act. The species is relatively solitary and found in dense, uneven-aged forest in steeply sloping or canyon terrain. Mexican spotted owls nest in the monument, and breeding activity has been monitored at various times between 1989 and 1998. The U.S. Fish and Wildlife Service recently designated critical habitat for the species within the monument, which primarily encompasses the backcountry closure area. Some level of recreational use and associated

noise disturbance likely occurs in the 1996 western boundary expansion area, which will continue until the new boundary is surveyed, fenced, and posted. The NPS is cooperating with the U.S. Fish and Wildlife Service and U.S. Forest Service to implement the management actions identified in the Mexican Spotted Owl Recovery Plan (U.S. Fish and Wildlife Service 1995). Specific actions include monitoring nesting activity and breeding success, protecting critical habitat from wildfire, and managing forest vegetation to conserve specific microhabitat attributes.

The peregrine falcon (*Falco peregrinus* ssp. *anatum*) occurs within Walnut Canyon. The species was recently removed from the endangered species list by the U.S. Fish and Wildlife Service, but the recovery plan requires that the population be monitored for long-term stability. Peregrine falcons have established two breeding aeries on steep cliff faces within the monument. One of the aeries lies within the backcountry closure area within the monument. The other is included in the 1996 western boundary expansion area, and is located on a cliff that has been subject to recreational climbing activity in the past. Some recreational disturbance will likely continue until the new boundary is surveyed, fenced, and posted. No NPS management activities, including visitor activities, are currently occurring or proposed on or above known peregrine aerie cliffs.

The northern goshawk (*Accipiter gentilis*), a species of concern, also nests within the monument. Northern goshawks are relatively solitary raptors that prefer forest interior habitats. Two nest sites have been

documented within the monument in the backcountry closure area.

The mountain lion (*Felis concolor*), although not formally protected or designated a species of concern, remains a concern for NPS managers because it is a large predator with an expansive home range that transcends the monument boundary. The NPS currently has very little information on the distribution and abundance of mountain lions within the Walnut Canyon area, but suspects the canyon provides good den sites. As Flagstaff continues to grow, residential development is anticipated to encroach upon the western monument boundary. Along with this growth, recreational activity is expected to increase in proximity to the boundary, along with the potential for human-mountain lion interactions. NPS resource management policy directs the agency to sustain the ecological role of natural predators while minimizing threats to public safety.

Bat species are considered to have specialized habitat requirements and sensitivity to environmental impacts. Twelve species are currently monitored within Coconino County as species of concern. The fractured limestone faces of Walnut Canyon provide ample bat habitat, and Townsend's big-eared bat and other sensitive species potentially occur within the monument. The NPS has little information on the bat fauna, but recently began efforts to inventory this faunal group.

LONG-TERM INTEGRITY OF WETLANDS, FLOODPLAINS, AND RIPARIAN RESOURCES

This section complements the preceding section on natural systems

and processes, and is intended to specifically address compliance with executive orders mandating wetlands conservation and floodplain planning requirements. In addition, most floodplains and wetlands in the Southwestern United States harbor unique riparian habitats and rare species. During the public and agency scoping process, pertinent issues include potential impacts to the narrow riparian corridor along the Walnut Canyon floor and isolated perennial seeps and springs found primarily within the tributary side canyons. Scoping issues also included the development of facilities and accommodation of visitor activities in potential flashflood areas. The primary concern expressed about wetlands, floodplains, and riparian habitat was ensuring that the unique riparian resources are conserved within Walnut Canyon.

Region

The southern Colorado Plateau receives a limited amount of precipitation, and surface waters are scarce. Accordingly, streams, wetlands, and riparian areas within the region surrounding Walnut Canyon National Monument are precious resources. Among all biological groups within the region, the fishes have the greatest number of species that are formally protected under the Endangered Species Act (Arizona Game and Fish Department 2001). Numerous protected and sensitive plants, animals, and invertebrates are restricted to perennial streams, wetlands, or riparian habitats, reflecting widespread alteration and threats to most of the region's freshwater ecosystems.

The region typically experiences a period of drought from early spring

through summer, a strong thunderstorm "monsoon" from late summer through early autumn, and unpredictable precipitation during the winter. Precipitation amounts strongly correlate with elevation. Most of the regional watershed drains northeastward from the San Francisco Mountains and surrounding Coconino Plateau into the Little Colorado River. The Little Colorado River headwaters reach 200 miles southeast into New Mexico. The river flows into the Colorado River at Marble Canyon and then through the Grand Canyon. A smaller area of the regional watershed drains south of the Mogollon Rim highlands into the Verde River basin.

All perennial streams and intermittent tributary washes are heavily impacted by human uses, primarily livestock grazing, but also by damming, diversion, and groundwater withdrawals for public water supply, hydropower generation, limited agriculture and industry, and public recreation. Narrow galleries of cottonwood, willow, and sycamore trees once dominated most stream banks, but are now almost entirely replaced by thickets of nonnative tamarisk and desert scrub. Available riparian habitat and water sources for wildlife have also diminished during the last century, especially for birds.

Reliable springs and seeps are rare throughout the region and even scarcer in the northern half. Although springs support small riparian areas, these are usually rich in plant species and provide important surface water for wildlife such as elk, deer, and antelope. Springs are fed either from shallow, perched aquifers or from the large, regional Coconino Aquifer (Bills et al. 2000). Winter precipitation seems to play an important role in

recharging these aquifers. Most springwater within the Inner Basin of the San Francisco Mountains is completely used as part of the public water supply for Flagstaff. Many reliable springs that are near areas with good rangeland have been fully contained and diverted for livestock use and are no longer available to wildlife. Some, such as Oak Creek, are now popular public recreation attractions.

Considerable vegetation change has occurred within the regional watershed during the last century, which is likely having a measurable influence on groundwater recharge rates. Fire suppression at higher elevations is leading to overcrowded forest stands. At mid-elevation, fire suppression and livestock grazing are believed to contribute to woodland encroachment into existing grasslands. Livestock grazing at lower elevations has favored the expansion of desert scrub into former arid grasslands. Increased forest and woodland tree numbers are intercepting groundwater in the root zone before it can infiltrate and recharge aquifers. Increasing aridity and loss of herbaceous cover at lower elevations promotes rapid precipitation runoff and decreases soil infiltration rates.

The combined extreme nature of summer thunderstorms, rapid spring snowmelt during some years, reduced herbaceous cover, and thin hydrophobic soils over much of the watershed make flash flooding a real safety threat within the region. Many of the major washes and Little Colorado River flood quite frequently following these events. Storm runoff patterns in most intermittent tributary washes that feed the Little Colorado are also influenced by the

construction of numerous stock tank impoundments in support of ranching operations.

Other regional surface water sources include windmills and powered pump wells. Because reliable groundwater is typically limited to the Coconino Aquifer at depths of 1,700 feet or more, the use of water wells is fairly cost prohibitive. Passive precipitation catchment systems, or "guzzlers" have recently become popular for supporting wildlife, ranching, and recreational activities.

Park

Wetland, floodplain, and riparian resources within Walnut Canyon National Monument are restricted to the narrow canyon bottom and a number of perennial seeps found in the tributary canyons on the south side of the monument. The floor of Walnut Canyon within the monument harbors approximately 80 acres of well-developed riparian vegetation, which is locally dominated by stands of Arizona walnut and cottonwood trees. Box elder, New Mexico locust, Arizona wild rose, and red osier dogwood are also common. The riparian plant community is very rich in shrub, wildflower, vine, and a few obligate wetland species. In the narrow reaches of the drainage, water catchment basins are scoured into Coconino Sandstone bedrock. These are filled seasonally by local snowmelt and rainfall and provide important water sources for wildlife. In addition, numerous localized seeps have been recorded in the fractures and bedding planes of the steep canyon walls. Prominent seeps are also found in the tributary canyons on the south side of the monument. Wetlands that meet U.S. Fish and Wildlife Service jurisdictional criteria under Section 404 of the Clean Water

Act are likely restricted to the narrow canyon drainage and perennial seeps.

The Walnut Canyon watershed drains an area of approximately 170 square miles. The headwaters of Walnut Creek are found in the Mormon Mountain-Mormon Lake area more than 20 miles south of the monument. Prior to 1900, the creek is believed to have intermittently flowed through the bottom of Walnut Canyon on a biannual cycle. Reliable flows typically occurred early each year during the period of spring snowmelt, and less predictable flows likely occurred later each year during in the summer and fall thunderstorm season. The natural hydrology within the Walnut Canyon drainage was severely altered when the city of Flagstaff began impounding Walnut Creek for use as its public water supply. Around 1900, the first dam was built upstream of the monument to create Lower Lake Mary. The dam significantly disrupted seasonal water flow through the canyon. A second dam was built in 1941 to create Upper Lake Mary, at which time Walnut Creek ceased flowing. Since 1941, the canyon has flooded only three times during extreme storm events that completely filled both lakes. Flows of lesser magnitude occur about once a decade from smaller tributary watersheds below the lakes.

The impoundment and diversion of Walnut Creek for the last 60 years has greatly impacted the wetland, floodplain, and riparian resources within the monument. The processes of stream channel scouring, sediment transport, terrace formation, and local spring and seep recharge have been altered in ways that may never be fully understood. Riparian vegetation is also changing in the absence of seasonal flows. Historic photographs

from the 1940s show a well-defined stream channel along the canyon bottom. Today, the channel is obscured by vegetation. True riparian species, including the Arizona walnut for which the canyon is named, are believed to be decreasing in number, and New Mexico locust now dominates the former open drainage channel. Most of the riparian species that have persisted for the last four decades are expected to survive, albeit in different proportions than prior to the construction of the dams. Local wildlife populations have probably already adapted to less-reliable surface water. Aquatic invertebrates and amphibians were likely impacted the most. The NPS believes that the riparian system is still changing in response to dewatering of the drainage, and long-term trends have yet to be assessed. The restoration of wetland, floodplain, and riparian resources is predicated upon cooperation by the city of Flagstaff to provide seasonal water releases from Upper and Lower Lake Mary.

Another relatively small impoundment exists near the downstream end of the canyon within the monument. The Santa Fe Dam was built around 1885 to supply water to the Santa Fe Railway, and has locally impacted riparian resources. The former reservoir area is now almost entirely filled with sediment, and most local storm flows pass through the dam's spillway. The Walnut Creek stream channel and sediment plain behind the dam are dominated by both native and nonnative weedy annual species, such as Russian thistle (*Salsola iberica*), cheatgrass (*Bromus tectorum*), horehound (*Marrubium vulgare*), sweet clover (*Melilotus albus*), and field bindweed (*Convolvulus arvensis*).

The canyon floor area around the reservoir is seasonally used by wildlife for both browse and water.

Currently, there are no NPS visitor facilities within the Walnut Canyon bottom or near the perennial seeps. Riparian resources are buffered from water quality degradation by surrounding undeveloped Coconino National Forest and Arizona State trust lands. However, the city of Flagstaff has annexed all lands to the north and west boundary of Walnut Canyon National Monument, including a relatively large area contiguous to the canyon rim and tributary canyons west of the monument. Development of these lands within the relatively pristine canyon watershed could significantly increase non-point source pollution, such as motor and exhaust residue from streets, and fertilizers, herbicides, and pet waste from lawns.

The occurrence of shallow groundwater is expressed only via the aforementioned seeps within sedimentary rock fractures and bedding planes. It is believed that the seeps are recharged via local fractures and limestone "karst" erosion features in the watershed, and there is little threat of contamination or aquifer depletion under current land uses within the watershed. The only reliable groundwater beneath the monument is found at a depth greater than 1,500 feet within the regional Coconino Aquifer. The NPS maintains a well into the aquifer to supply operations at the monument, and the water table has remained relatively stable.

ABILITY TO EXPERIENCE PARK RESOURCES

The scoping process identified the visitors' ability to experience park resources related to park significance as an issue. Concerns include access to park resources by the general public, access to information provided by museum collections and ability to see the "real thing" (actual artifacts, dwellings, etc., as opposed to replicas or simulations); minimally altered environment; access to a full spectrum of park resources for visitors with disabilities; ability of the public to understand park resources; ability to experience scenic, recreational, and educational pursuits; visitor understanding of regional context; uncrowded visitor experiences; visibility of night skies and natural soundscapes; and ability to hear natural sounds. Concerns also include personal freedom (inside and outside park boundaries); traditional employee/visitor experiences (interpretation through personal services, access to favorite sites); and traditional recreational activities (biking, climbing, etc.).

Region

The Flagstaff Area monuments are relatively small enclaves of National Park Service management located within a geographic area dominated by the much larger Coconino National Forest. Although natural and cultural resources within the monuments are recognized and protected for their special significance, they cannot be separated from their regional context. The geologic, natural, historic, and prehistoric stories of these places continue across monument and forest boundaries and throughout much of northern Arizona; they can be fully appreciated and understood only as part of this larger picture.

Similarly, outdoor recreational opportunities abound in northern

Arizona, on lands managed by a variety of agencies. The Flagstaff Area monuments are managed in accordance with the NPS mandate "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Concerns about traditional and proposed visitor experiences and recreational activities in the parks are evaluated in this context; it is recognized that certain activities, while inappropriate on NPS lands, are both appropriate and encouraged elsewhere. As population and development increase both locally and regionally, demand for recreational opportunities on public lands will increase accordingly. NPS information/education efforts are designed as part of a cooperative interagency effort to direct visitors to the best locations for their desired activities, whether on NPS, USFS, or other lands.

The public's ability to experience park resources is thus closely related to availability of resources on nearby non-NPS lands. Interpretation of park resources as part of a regional system is crucial, but not currently being accomplished. In all three Flagstaff Area monuments, wayside and museum exhibits are outdated and inaccurate and fail to emphasize the desired big picture. A major interpretive planning effort-to replace wayside interpretive signs along trails and roadsides and to redo museum exhibits in the visitor centers-is under way, concurrent with this GMP. The new exhibits will present a cohesive story, linking the natural and cultural resources of these three monuments with NPS, USFS, and other sites

throughout the region. They will be designed for full accessibility, to serve visitors with disabilities and/or different learning styles, and they will enhance visitors' ability to see the "real thing," using the actual structure, feature, or artifact whenever possible, or models, electronic images, virtual tours, or other means when necessary. Programmatic accessibility for visitors with a variety of impairments is being addressed in the Comprehensive Interpretive Plan.

The opportunity to present this type of interpretive message in a comprehensive manner is great, because travel patterns of visitors to the Flagstaff Area monuments are fairly well defined. Visitor surveys (Lee and Treadwell 1999) indicate that the majority of Sunset Crater Volcano/Wupatki visitors travel from south to north along FR545, the 36-mile scenic road connecting the two parks. Most (68-70%) are engaged in a longer trip and are en route to Grand Canyon National Park and/or points north. Of Walnut Canyon visitors, 49% also go to Sunset Crater Volcano and 38% to Wupatki; for 61% this is part of a longer trip.

Park

As described in the Purpose and Need section, Walnut Canyon's purpose is "to protect ancient cliff dwellings and associated resources that are of great ethnographic, scientific, and educational interest, and to properly care for and manage the cultural and natural resources of historic, social, and scientific interest..."

Because of the physical layout of the park, visitors have the opportunity to experience the variety of park resources, but within a limited portion of the entire canyon. Walnut Canyon

as a meandering geological feature is approximately 14 miles long. Ten miles lie within park boundaries, but only short segments and occasional side canyons are visible from most vantage points. This presents a confusing picture to visitors trying to understand the extent of prehistoric settlement and the direction of water flow through the canyon. An interpretive goal both in the visitor center and at overlooks is to make the canyon-the primary resource-understandable.

Unlike the other two Flagstaff Area monuments, Walnut Canyon is not a drive-through experience. The three-mile entrance road ends at the visitor center parking lot, which also serves the primary picnic area and two self-guided trails. Visitation to the canyon is therefore concentrated in this small area, occupying about 1/2 square mile, and is pedestrian in nature.

The visitor center affords excellent views into the canyon and contains a small museum in which exhibits convey basic concepts about the people who built the cliff dwellings. The building is constructed on several levels connected by stairs; the resulting accessibility issues have been temporarily remedied through the installation of wheelchair lifts, but long-term architectural solutions are needed.

Visitors can walk two interpretive trails. The half-mile Rim Trail follows the edge of Walnut Canyon to two overlooks, then winds through pinyon-juniper forest to a small pueblo and pithouse, returning finally to the picnic area and visitor center parking lot. This trail is relatively level and paved. The first 100 yards (to the first overlook) currently meet accessibility standards, and additional improvements are planned to provide

access to the pithouse area. The Island Trail descends 185 feet (about halfway) into the canyon, passing 25 cliff dwelling rooms that encircle the base of Third Fort (structural remains perched on the highest point of the "island" landform within the canyon). The "fort" itself is off-trail and not open to visitation. The trail is paved and includes 240 concrete steps, making this experience a physical impossibility for many visitors. Ranger-led hikes are offered seasonally to the historic ranger cabin, which predates NPS management of the monument, and to other archeological sites in the canyon. Hiking is not permitted in the canyon bottom.

Motorized sightseeing is limited to views of the forest along the entrance road; the canyon, and cliff dwellings, and rim side dwellings are not visible from the road. Occasional visitation occurs to the south side of the canyon via unpaved USFS roads, but there is no NPS presence and no on-site interpretation of the resources.

We can only imagine the actual appearance of the canyon walls, cultivated croplands, vegetative cover, and other elements as they were during the occupation of the cliff dwellings. To today's visitors, the forested Walnut Canyon environment appears natural and little altered by modern activities. However, water flows in the canyon have been greatly altered by upstream dam construction during the last century, and wildlife and vegetation within the canyon have changed accordingly. Additional alteration to the natural scene is probable as Flagstaff residential development extends closer to the park boundary.

According to recent visitor surveys (Lee and Treadwell 1999), visitors are

generally satisfied with their experience at Walnut Canyon. Most visitors incorporate their trip as part of a larger travel plan, and many are on their way to or from Grand Canyon National Park. Many visitors want to see Walnut Canyon and its archeological ruins. Many also expressed the desire to look at scenery, enjoy the sights and sounds of nature, and share the park with others (many are locals who are giving a tour to family and/or friends).

PARK NEIGHBORS; LOCAL, STATE, AND TRIBAL LAND MANAGEMENT PLANS; AND LAND/RESOURCE MANAGING AGENCIES

Impact topics were identified through the scoping process, and concerns covered by this section include effects on neighbors' access and emergency response, economic contribution of the park to local economies, access to culturally sensitive areas by traditional users, traditional land uses external to park boundaries, and possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls.

Region

Walnut Canyon National Monument is east of the city of Flagstaff, Arizona. Phoenix, a rapidly growing metropolitan complex of more than two million people, is 150 miles south of Flagstaff. Flagstaff, a major community of northern Arizona, has a population of approximately 55,000. Flagstaff offers numerous services for the extensive ranching, lumber, and tourist activities of northern Arizona. The area between Flagstaff and Sunset Crater Volcano and Walnut Canyon is being subjected to

increasing residential and business development. The remainder of the region surrounding the monuments is sparsely populated, although a private development (called "Alpine Ranchos") is increasing in population northeast of Sunset Crater Volcano, leading to substantial increases in nonpark travel on park roads.

Land use in the region varies from the expanding urban influences of Flagstaff near Sunset Crater Volcano and Walnut Canyon to low-intensity grazing at Wupatki. The Coconino National Forest, surrounding Sunset and Walnut and bordering Wupatki on the south and west, is under multiple-use management. The primary uses near the monuments are recreation and grazing.

Information from the U.S. Geological Survey indicates that some lands in the area of the monuments are prospectively valuable for oil and gas, geothermal steam, and associated geothermal resources. Because of the lack of surface indications and drilling data, the potential for geothermal energy development and for discovery of oil and gas in the area is unknown at the present time. The Coconino National Forest and adjacent region are currently being studied by the U.S. Geological Survey and private corporations for potential geothermal development. Permits have been granted by the U.S. Forest Service to energy-related firms for research on Forest Service lands adjacent to the Wupatki boundary. Based on present information, there are no additional valuable leasable minerals. Minerals, including cinder, pumice, gypsum, miscellaneous clays, sulfur, and uranium, are reported in the area surrounding the park, and the finding of meteorites and meteorite diamonds has been reported in the

vicinity. It is unknown to what extent, if any, these minerals exist at commercially valuable levels in the monument. A cinder quarry operation is located outside Sunset Crater Volcano, northwest of the visitor center.

Woodcutting, shooting/hunting, and off-road vehicle activities are evident throughout Forest Service areas adjacent to the monument. Occasionally, these incompatible activities spill over onto monument property because boundaries have not yet been completely fenced.

The location of the monument within this regional complex of public lands is one of the most important aspects determining its visitation pattern, as well as its resource management problems and programs.

There is no public transportation to any of the three Flagstaff Area monuments. Sightseeing bus tours are operated by Nava-Hopi Tours, Grayline Tours, and smaller commercial companies throughout the year.

US89, a major north-south route through Arizona and Utah, and I-40 provide access to the parks from Flagstaff, which is served by Amtrak rail service, bus service, commercial airlines, and private vehicles via I-40 and I-17.

Park

Expansion of the monument in 1996 added approximately 1,333 acres, which have not been surveyed or fenced. There is some confusion on the part of public users regarding where forest lands end and the monument begins. The new lands on the west side of the monument are within two miles of residential areas of the city of Flagstaff, and parts of

AFFECTED ENVIRONMENT

the west boundary of the monument coincide with the corporate boundary of the city of Flagstaff. Forest resources include ponderosa pine, pinyon pine, and juniper, which attract woodcutters seeking personal firewood. There are antelope, elk, and deer that attract hunters and wildlife viewers. The Coconino National Forest administers several permits for grazing by local ranchers in the lands adjacent to the monument. Traditional and current forest uses by citizens of Flagstaff include horseback riding, recreational vehicle uses, hiking, camping, hunting, birding, woodcutting, shooting, and mountain biking. A section of the Arizona Trail passes the northwest corner of the monument and is used by local and regional visitors for recreational purposes. Because of this proximity, occasional inappropriate uses occur on monument property, including trespass, shooting, hunting, woodcutting, and vehicle travel.

Park Service staff are involved in the long-range planning efforts of the city and county. User and resource protection activities occasionally involve Forest Service, Arizona Game and Fish, City of Flagstaff, Coconino County, and other units of the National Park System. Relationships with these other agencies are strong and cooperation is excellent.

Emergency responses in the Walnut Canyon area come from the various land management agencies and public safety organizations. The National Park Service provides assistance with law enforcement, search and rescue, emergency medical assistance, and wild fire management in the immediate area. The county deputizes NPS rangers, and members of the NPS staff serve as crew on

national forest fire fighting teams. Coconino County provides law enforcement and search and rescue. The Forest Service provides law enforcement relative to recreation, consumptive uses, grazing, and wild fire suppression. Arizona Game and Fish provides law enforcement relative to hunting activities. The Arizona Department of Public Safety provides law enforcement (traffic) on primary roads and air support in search and rescue operations. The city of Flagstaff (Guardian Ambulance) provides medical emergency responses (ground and air).

Three state trust sections of land adjacent to, or within two miles of, the monument could be offered for sale and development. Development could pose external threats in the form of increased unauthorized uses, trespass by animals, pollution, noise, and degradation of the viewshed.

Approximately 291 acres of private land exist inside the eastern area of the monument, and there is potential for development by the owner. The owner is supportive of NPS programs and is very cooperative; however, development of this private property could result in water impoundment behind a historic dam to create a lake that could possibly back up onto monument land. There is the potential for residential development and increased exposure of cultural resources to trespass and inappropriate uses resulting from residential development and the attraction of a lake. The land protection plan (NPS 1990) recommends acquisition of this inholding, and the owner has expressed willingness to consider NPS acquisition.

The NPS money generation model is a formula used to estimate the benefits

attributed to the local economy resulting from the number of visitors to National Park System areas. The estimates of those contributions to the greater Flagstaff economy from Walnut Canyon National Monument include tax revenue of \$106,119 and a total spending revenue of \$2,122,377 (based on the latest calculations from 1996).

There are several cooperative agreements with other agencies: a multiagency agreement for wild fire management, an agreement with the Coconino National Forest and Coconino County Sheriff's Office for joint law enforcement activity, a cooperative program with Coconino National Forest for educational activities on both forest and park lands, and an annual contract with the city of Flagstaff for structural fire suppression.

The canyon has significant biological diversity and concentrations of threatened and endangered species. Additionally, mountain lion, bear, antelope, deer, and elk move through the monument, exemplifying the diverse habitat located so close to city development. Visitation to the canyon itself is not encouraged, and local uses are minimum and seasonal. The monument staff works in cooperation with other land and resource management agencies in inventory and monitoring activities.

Ten affiliated tribes have identified traditional relationships and/or cultural properties within park boundaries and have concerns about public access to sites; some groups

need access to restricted use areas for plant gathering and traditional activities. Consultation with these tribes is routine and ongoing.

OPERATIONAL EFFICIENCY

Roadways and Access

Access to Walnut Canyon National Monument is gained primarily via I-40, approximately 5 miles south of the city of Flagstaff, and a paved 3-mile entrance road. Visitors travel 2.1 miles before entering park boundaries. The entrance road was constructed in 1963 and was built specifically to provide access from I-40 to the park. Construction of I-40 was completed in the late 1950s and early 1960s and replaced the famed Route 66.

The entrance road provides the primary access to the north rim and to the park's residential area and maintenance complex. The road terminates at a loop parking lot immediate adjacent to the visitor center. Three small pullouts with picnic areas exist along the roadway; two are on the west side of the road, and one is on the east side. Employees and visitors traveling this road are at risk of hitting large game, primarily deer. Shoulders have steep drop-offs and are quite narrow. There is seldom room for a vehicle to safely pull to the side of the road.

The original entrance road, also known as the Old Walnut Canyon Road, or FR303, begins at the Flagstaff city limits and terminates at I-40 approximately two miles west of the Walnut Canyon exit. It intersects with the park entrance road approximately 1/2 mile north of the entrance station. This road is sometimes used as a commuter route by residents living near Cosnino on the north and south sides of I-40. Both the paved entrance



road and FR303 are patrolled by NPS personnel. The Forest Service and Coconino County maintain FR303, and NPS maintains the entrance road. Use of the entrance road and FR303 is not regulated. Entrance to the park, however, is gated just beyond the entrance station, and locked at night.

There are a number of official and unofficial roads USFS roads to the west and northwest of the monument that provide access up to park boundaries. Most of these roads emanate off of FR303.

The south rim of the park is closed to all visitation. Myriad undeveloped roads provide access to the south boundary, including FR128 and FR128c. FR128 is accessed via I-40 at the Townsend/Winona exit, approximately six miles east of the Walnut Canyon exit. FR128 leads to Anderson Mesa and Marshall Lake and terminates at Lake Mary at the intersection of Forest Highway 3 (the Lake Mary Road). Only one road provides access into the park on the south rim: FR128c, a 3.4-mile spur road off FR128, was constructed by the Forest Service in the 1980s and leads to a small overlook that provides a view of the Walnut Canyon drainage system.

Public access via Forest Service roads on the south rim, and the lack of NPS presence make protection of park resources difficult. The extensive travel time (approximately 1 hour via FR128) to the south rim poses difficulties in responding to emergencies in a timely fashion. The inability to regulate the use of forest roads adjacent to park boundaries makes protection of resources difficult, and unauthorized access into the park occurs fairly frequently.

Facilities

Visitor use areas and facilities within the park include two self-guided trails, a visitor center, museum, and picnic areas. As noted previously, three small picnic areas are located along the entrance road.

Other facilities include four single-family residences, one mobile home, a maintenance shop complex, a historic log cabin (in need of extensive and comprehensive preservation treatment) and support infrastructure (utilities, secondary roads, fences, and other outbuildings), all dated and in need of substantial upgrade. Four permanent employees reside in park housing, and the mobile home is used for one or two seasonal employees. Two housing units are historic, built in 1939, and both need extensive upgrade. The mobile home needs to be removed and replaced with adequate seasonal quarters. Three employees are required occupants and provide minimum after-hours coverage for protection and maintenance emergencies.

Park facilities and infrastructure date from the late 1930s and early 1940s and from the 1960s (Mission 66). Maintenance activities focus primarily on custodial activities and routine required tasks. There is insufficient staff to function in a proactive manner in regard to preventive maintenance.

The visitor center is vintage Mission 66 construction and essentially serves as a substantial addition to the original visitor center. A large "loop" parking lot adjacent to the visitor center also serves the Island and Rim Trails. The visitor center also serves as offices for park interpretive and law enforcement staff. It also contains space for curatorial collections and a

small museum. This facility is considered inadequate and obsolete and in serious need of upgrading and remodeling. The lack of fire and climate control and the existence of outdated utilities and features has placed collections and exhibits at risk and has created an inhospitable work environment.

The parking lot is too small for buses and vehicles towing trailers and for the number of park visitors, resulting in overflow onto the entrance road, which creates an unsafe situation. In extreme situations, visitors are denied entry to the park.

The primary visitor attraction is the Island Trail, which begins and ends at the visitor center and requires visitors to descend (and ascend) 240 steps into the canyon. There are numerous steep exposures along the trail, and it is quite narrow and often overcrowded, forcing people to step off onto rough terrain to allow others to pass. The climb out of the canyon in conjunction with the elevation of 6,700 feet often taxes the capabilities of visitors. The trail is a little under a mile long, and it encircles the "Third Fort," allowing visitors access to 25 cliff dwellings rooms. Because of the steepness of the trail, it is not accessible to persons with disabilities.

A second trail, the Rim Trail, is a 0.7-mile loop trail that takes visitors along the north rim of the canyon and past two developed archeological sites. It is fairly flat and accessible to persons with mobility impairments for a portion of its length.

For resources protection and preservation purposes, the remaining portion of the park, including the south rim, are closed to visitor use. The new additions to the park as a result of the recent boundary

expansion remain open to the public. Some uses that occurred within these areas before management was transferred to the NPS may continue to be allowed. Consumptive uses, such as hunting, firewood cutting, will not be allowed. OHV use is restricted to established roads.

There are no gas, food service, camping, or concession operations in the park. The visitor center contains a bookstore operated by the Southwest Parks and Monuments Association. Fees are collected at the entrance station during peak visitor use periods (mid-May through September), and at all other times are collected at the visitor center.

Utilities

The Park Service owns and operates the water and wastewater (sewer) systems. Arizona Public Service provides electrical service. U.S. West and AT&T provide the telephone service, but the monument owns its own phone system. The city of Flagstaff provides trash (solid waste) pickup through contract.

The park's domestic water supply is provided by a 440-foot well and contained in an elevated 50,000-gallon storage tank.

A large surface lagoon located along the north central boundary of the park manages wastewater. The lagoon currently operates at maximum capacity and requires pumping on a regular basis.

Walnut Canyon is connected to the other two monuments and the headquarters office via radio. The repeater for the radio is located on O'Leary Peak adjacent to Sunset Crater Volcano and is subject to damage from lightning strikes.

Staffing

A central Headquarters, located in Flagstaff, provides administrative services for the three monuments and is the office location for the superintendent and division heads for administration, resource management, ranger activities and fee collection, maintenance, and the cooperating association (Southwest Parks and Monuments Association). The facility also serves as a visitor information center for the three Flagstaff Area monuments and for other parks and points of interest in northern Arizona.

Resource management activities are accomplished by headquarters-based staff. Both resource management staff and park law enforcement staff have implemented a resource monitoring and patrol program. Resources management staff conducts limited research; however, the majority of the research is conducted by various agencies and institutions and selected and qualified interested individuals.

Interpretation and law enforcement staffing is concentrated at the visitor center and visitor services are provided primarily from that location. Because of the need to run both an information desk and fee collection kiosk, it is often difficult to provide staff for patrols, interpretive programs, and interpretive presence at the park resources.

Ranger patrols are conducted within the monument, around its perimeter, and occasionally onto adjacent National Forest lands. During busy visitation periods, there are not enough permanent staff members to respond to the increased needs of visitor services, protection, and resource management. Most visitor

contact functions and programs are accomplished through Student Conservation Association employees and Volunteers-in-Park.

Staffing levels in all aspects of park operations, that is, to provide the necessary protection and preservation of park resources, to address visitor use needs, and to perform the necessary maintenance to park facilities and infrastructure, are considered inadequate.

One maintenance employee is a required occupant at Walnut Canyon. Staff numbers are inadequate to provide the desired level of janitorial services, and many routine housekeeping and maintenance needs are deferred. Maintenance staff from Sunset Crater Volcano provide assistance on an as-needed basis.

The majority of collections for the Flagstaff Area National Monuments have been relocated to the Wupatki curatorial storage room. Storage space, storage environment, and protection at Walnut Canyon and Sunset Crater Volcano for museum objects are limited and poor. Storage environment at Wupatki is also poor, although it does provide a more secure location for the bulk of the collection. Approximately 50,000 objects, including historic photograph files, archives, natural history specimens, and archeological, ethnographical, and historical items, are stored at Wupatki.

All unprocessed collections, the rare book collection, the research library, and computer support are housed at the headquarters office.

Approximately 500 objects, including natural history specimens, ground stone artifacts, and archival material, are stored in the Walnut Canyon visitor center lunchroom. Storage

space is limited to two small closets and some office space. The storage environment and security of the collections at Walnut Canyon is extremely poor. Because of limited space and environmental and accountability concerns, the majority of the collection has been moved to the Wupatki curatorial storage room.

Employee health and safety issues include potential exposure to hantavirus and other diseases resulting from rodent infestations in government quarters and workspaces. Efforts to mitigate the presence of the rodents are ongoing, but mice and other rodents often get into buildings. During the winter months staff are exposed to potentially

dangerous driving conditions if they are required to conduct business at the other Flagstaff Area parks or headquarters during inclement weather. Mountain lion and black bear are known to occasionally frequent the general area of the trail and visitor center, posing a potential risk to visitors and employees.



ENVIRONMENTAL CONSEQUENCES

METHODOLOGY

All alternatives were evaluated for their effects on the resources and values determined during the scoping process, and impact topics were developed. For each impact topic, impacts are defined in terms of context, intensity, duration, and timing. Direct, indirect, and cumulative effects are discussed in each impact topic. Definitions of intensity levels varied by impact topic, but, for all impact topics, the following definitions were applied.

Beneficial: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse: A change that moves the resource away from a desired condition or detracts from its appearance or condition.

Direct: An effect that is caused by an action and occurs in the same time and place.

Indirect: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.

Short-term: An effect that within a short period of time (generally one or two years but no more than five years) would no longer be detectable as the resource is returned to its predisturbance condition or appearance, generally less than 5 years.

Long-term: A change in a resource or its condition that does not return to predisturbance condition or appearance and for all practical purposes is considered permanent.

All alternatives were also evaluated based on external factors that, together with the actions of each NPS alternative, could have cumulative impacts. In order to determine cumulative impacts, a cumulative scenario was developed. That scenario included the following actions:

On Forest Service lands, there will be some reduction in roads. Monitoring of impacts will increase, but existing activities will continue unless monitoring shows problems. Forest closures/increased restrictions (including those related to fire hazard conditions) may transfer some pressure to parks. Increased access to different locations on USFS lands may affect park-eligible resources. The Forest Service is currently managing areas next to the city as open space, but would rather exchange such areas in accordance with regional land use plans. The urban boundary would then move closer to the parks. The Forest Service "Company's Coming" program could affect all three parks.

Increased growth of Flagstaff could mean more visits/demand for use of parks. Flagstaff is marketing the parks as part of their plan to attract more visitors. There are also increased tribal requests for use of renewable/nonrenewable resources.

Upstream dams and impoundments (Upper and Lower Lake Mary) will continue to affect water flow and the riparian corridor within Walnut Canyon.

Changes at Grand Canyon National Park could have implications for all three parks. The transportation plan restricts visitor use at the east entrance (visitors are no longer

allowed to stop, just drive through). This could mean that visitors arriving in Flagstaff after visiting Grand Canyon may have more time to spend at Walnut Canyon. However, there may be a decrease in the number of visitors, but more demand for things to do by those who do come.

Development of the private inholding within Walnut Canyon National Monument could impact natural and cultural resources, including the historic Santa Fe Dam, and could alter views from primary public use areas within the monument.

Our ability to manage wildlife may be influenced by Arizona Game and Fish Department objectives. There will be increased ecosystem research (long-term monitoring).

Past activities like grazing and pot hunting continue to have effects.

LONG-TERM INTEGRITY OF ARCHEOLOGICAL RESOURCES

Methodology

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places. The process begins with an identification and evaluation of cultural resources for National Register eligibility, followed by an assessment of effect on those eligible resources, and concluding after a consultation process. If an action (undertaking) could change in any way the characteristics that qualify the resource for inclusion on the National Register, it is considered to have an effect. No adverse effect means there could be an effect, but the effect would not be harmful to

those characteristics that qualify the resource for inclusion on the National Register. Adverse effect means the effect could diminish the integrity of the characteristics that qualify the resource for the National Register.

In order to analyze the effects of the GMP alternatives on archeological resources, all available information on known archeological sites was compiled (Baldwin and Bremer 1986; NPS Flagstaff Area archives; MNA, USFS and NPS archeological site files). Map locations of archeological sites were compared with locations of proposed developments and proposed modifications to existing facilities. Predictions about short- and long-term site impacts from visitation were based on previous studies of visitor impacts to archeological sites (Cinnamon n.d.; Coder et al. 1995a, 1995b; Downum et al. 1996; Fawcett 1993; Gale 1985; Green and LaBlanc 1979; Lightfoot and Francis 1978; Moore 1994; Nickens 1991; Nielsen 1991; U.S. General Accounting Office 1987; Wildesen 1982; Wood and Johnson 1978) and other nonrenewable resources in nearby parks (Roggenbuck et al. 1997), as well as on recent monitoring data from the Flagstaff Area National Monuments (Fairley 1998; Johnson 1999; O'Hara and Johnson 1997). Sociological studies comparing the deterrent effects of signs vs. ranger presence on sites were also considered in this analysis (Clark 1976; Johnson and Vande Kamp 1996; Johnson et al. 1994; Vande Kamp et al. 1994; Swearingen and Johnson 1994).

Archeological sites are continually deteriorating, due primarily to the effects of weather and gravity. Left alone, sites will inevitably degrade over time. Impacts from human visitation and use contribute to the

effects of natural agents of deterioration, and they can substantially increase the rate of site deterioration. In general, it is not possible to control the deterioration caused by natural elements. In contrast, it is possible to control the effects of human impacts through careful planning of activities and new developments, by educating visitors and park staff, and by limiting or directing locations of human activity in and around archeological sites.

If we exclude impacts caused by deliberate vandalism or artifact collection, most impacts resulting from visitor use are relatively minor when considered on an individual basis. However, for the purposes of this plan, it is necessary to consider the cumulative effects caused by hundreds or thousands of visitors at a given location over the life of this plan. Thus, for example, while a single guided hike to an archeological site may have a negligible effect on site integrity, the cumulative impact of hundreds of hikers over 10-15 years at dozens of sites can be substantial. In the following section, impacts are analyzed for each alternative based on the numbers of sites that would be affected in conjunction with the cumulative effects of various types of activities over the life of the plan.

As noted above, effects to archeological resources can be either beneficial or adverse, direct or indirect, or short- or long-term. For the purposes of this analysis, levels of impact to archeological resources were defined as follows:

Negligible: The impact on archeological sites is at the lowest levels of detection, barely perceptible and not measurable.

Minor: The impact on archeological sites is measurable or perceptible, but it is slight and localized within a relatively small area of a site or group of sites. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed archeological site and would not have a permanent effect on the integrity of any archeological sites.

Moderate: The impact is measurable and perceptible. The impact changes one or more character defining feature(s) of an archeological resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.

Major: The impact on archeological sites is substantial, noticeable, and permanent. The impact is severe or of exceptional benefit. For National Register eligible or listed archeological sites, the impact changes one or more character defining features(s) of an archeological resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing in the National Register.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative, as well as the other two WACA alternatives, the following actions would occur:

The National Park Service would continue to work with the City of Flagstaff, Coconino County, the State of Arizona, the U.S. Forest Service, and other agencies to develop mutually beneficial partnerships.

ENVIRONMENTAL CONSEQUENCES

Resources located on Forest Service land adjacent to the monument would be managed in accordance with decisions reached in the FLEA process. Continuing NPS involvement in interagency planning and regional planning efforts would benefit archeological resources by ensuring that regional land management decisions take into account effects on archeological resources both inside and outside of the monument boundaries.

New interpretive wayside and museum exhibits would be installed in accordance with the Flagstaff Areas Comprehensive Interpretive Plan. Potentially, an upgrading/updating of interpretive media could improve long-term integrity of archeological resources through improving education of visitors about the significance, importance, and fragility of resources and how visitors can reduce their impacts to archeological sites.

The park would remain committed to improving accessibility for visitors with disabilities, and modifications of trails and other facilities to ensure safety for all visitors would continue. Improved definition and continued maintenance of trails would benefit archeological resources located in the vicinity by increasing compliance with rules restricting pedestrian activities to designated trails and reducing erosion problems adjacent to trails.

Under this and all other alternatives, the existing housing and maintenance area would be maintained in its current location. This would be a major benefit to archeological resources by confining the zone of disturbance from residential and maintenance activities to this previously disturbed area.

Under this and all other alternatives, the new lands added to the monument in 1996 would be surveyed and fenced. An archeological inventory of the boundary would be performed prior to installing the fence, to ensure that no archeological sites are inadvertently impacted. The fencing would be a major benefit to archeological resources by restricting off-road vehicular trespass on the monument. Furthermore, fencing and posting the monument boundaries would ensure that visitors are adequately informed of the fact that they are entering a national monument where certain specific activities such as hunting, camping and woodcutting, which can have both direct and indirect adverse impacts on archeological resources, are prohibited.

The current backcountry closure policy limiting visitor access beyond front country areas to ranger-guided tours, and requiring the issuance of permits for researchers and educational groups that have a special need to enter backcountry areas, would remain in effect. The closure will continue to have a major beneficial effect on archeological resources by substantially reducing impacts from unregulated visitation, such as collection of artifacts, destabilization of walls, soil compaction, social trailing, vandalism, and so on, thereby reducing the need for future impact mitigation.

Unlike the other two alternatives, the No-Action Alternative would involve no new construction, no additional trail developments and no road realignments, so there would be no new impacts to resources as a result of this alternative. Visitors would continue to have unguided access to six cliff-dwelling sites and two

surface-dwelling sites within the monument along the Island and Rim Trails. In addition, they would continue to visit five cliff-dwelling sites and one surface site via seasonal ranger-guided tours along the Ranger Cabin/Ledge Trail. The remaining sites in the monument would continue to be closed to visitor use.

Archeological resources adjacent to or easily accessible from public use areas would continue to be vulnerable to surface disturbance, inadvertent damage, soil compaction, and vandalism. Inadvertent impacts include knocking top course stones loose by walking on or leaning against ruin walls, touching original plasters, picking up or otherwise displacing pottery sherds and other artifacts, compacting cultural deposits, and creating social trails (which ultimately leads to erosion problems and destabilization of original architecture), plus the incremental cumulative effects of thousands of people walking around and through rooms. Intentional vandalism includes removing artifacts, inscribing graffiti, dismantling walls, and probing or digging in sites. A loss of the surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence would result. Some of these impacts could be mitigated through additional stabilization of site architecture (all front country sites have already been stabilized to some degree), rehabilitating social trails, and/or systematically collecting surface artifacts for long-term curation; however, over the long term, these management actions would detrimentally affect site integrity. Occasionally, the public would also adversely affect other sites through unauthorized pedestrian and

vehicular access to backcountry areas of the monument.

In summary, past management strategies have limited most impacts at archeological sites to eight heavily stabilized sites on the Island and Rim Trails and, since 1987, to five partially stabilized sites on the Ranger Cabin/Ledge Trail. Implementation of the No-Action Alternative would continue to provide access to these previously stabilized sites. In addition, an unknown number of sites in the "new lands" area of the monument would continue to receive impacts from uses that currently occur in these remote sections of the monument; however, these impacts would be substantially reduced by fencing and posting the monument boundaries. Overall, the current management approach has and would continue to limit adverse impacts to a relatively small number of previously stabilized sites. Therefore, the No-Action Alternative would continue to provide major long-term benefits to the long-term integrity of the majority of archeological resources in Walnut Canyon National Monument.

CUMULATIVE EFFECTS

Past management strategies have limited visitor impacts at archeological sites to eight heavily stabilized sites on the Island and Rim Trails, and since 1987, to five partially stabilized sites on the Ranger Cabin/Ledge Trail. This policy would continue under the No-Action Alternative.

The continuing growth of Flagstaff and ongoing efforts by the Flagstaff Chamber of Commerce to promote visitation to the Flagstaff Area national monuments would ultimately result in increased impacts to the monument's archeological resources. These impacts would primarily result

from increased permitted visitor use at front country interpreted sites in the form of incidental artifact collection, inadvertent destabilization of walls, and social trailing, although impacts from vandalism and illegal excavations in backcountry locations would likely increase as well. Continued growth in Flagstaff is also likely to result in significant development of private lands near the monument boundaries, which is also likely to result in increased unguided visitation to backcountry archeological sites within the monument.

Within the Flagstaff region generally, construction of new roads, housing subdivisions, mines, and other developments would continue to cause destruction of individual archeological sites. As the population of Flagstaff grows, recreational impacts on USFS lands and resources would continue to increase, resulting in additional degradation of archeological sites. As archeological sites are degraded and destroyed outside the park, the relative rarity and importance of the protected archeological resources within the monument would increase.

Road closures on Forest Service lands adjacent to the park could have a long-term major beneficial effect on archeological resources both inside and outside the park boundaries, by reducing levels of visitation and associated impacts (artifact collection, graffiti, etc.) and by reducing impacts from vehicles on archeological sites generally (rutting and erosion of topsoil, soil compaction, vegetation damage and removal).

Development of the inholding, either for private or commercial purposes, could have a long-term detrimental impact of archeological resources

within and adjacent to the monument. Adverse impacts could include destruction of individual sites by the construction of new facilities or degradation of resource values from increasing visitation impacts (artifact collection, trampling, graffiti, etc.) or from introducing new recreational activities (camping, fishing, horseback riding) in this remote corner of the monument.

CONCLUSION

The No-Action Alternative would have a major beneficial effect on maintaining the long-term integrity of the majority of archeological resources within the monument by concentrating visitor activities and park management impacts on previously disturbed and stabilized sites.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Impacts from installation of new waysides, upgrading of trails and facilities to accommodate accessibility, and fencing of the new monument boundary would be the same as described under the No-Action

Alternative. Existing maintenance facilities and housing would be retained.

Under Alternative 1, access to the park via the existing entrance road would be the same as under the No-Action Alternative.

No archeological sites would be impacted by the construction of the I-40 orientation pullout. At least two sites would be permanently obliterated by construction of a new parking lot and trail south of FR303. An unknown number of archeological sites (but probably fewer than 10) could be damaged or destroyed as a result of constructing the north rim scenic drive. (The exact number of sites that would be affected is uncertain, because intensive archeological inventories have not been completed for this east canyon area).

Alternative 1 would involve relocation of administrative functions from the visitor center to a new administrative facility adjoining a new parking area. Preliminary orientation functions would be relocated to the I-40 junction area. Over the long term, orientation provided at I-40 could reduce damage to archeological resources by giving visitors basic resource protection information before they enter the park. Relocating administrative functions would free up space in the visitor center that could potentially be used to increase public awareness of resource issues/impacts in general and thereby improve long-term integrity of archeological resources. Expanding and upgrading interpretive media could potentially improve long-term and scientific integrity of archeological resources through improved education of visitors about the significance, importance, and

fragility of archeological resources and the most effective means of reducing human impacts to park resources.

Alternative 1 would provide visitor access to many areas on the north rim that are currently closed to the public (hiking, biking, and horseback riding in the northwest corner, guided hikes east and west of the visitor center and at First Fort, plus motorized sightseeing along the north rim scenic drive). Through ranger-guided hikes, visitors would also be able to enter a large portion of the backcountry not currently open to visitation.

Numerous archeological sites could potentially be impacted by increased visitation to areas of the monument that are currently closed. Increasing visitation could affect the long-term integrity of archeological resources through the direct actions of visitors, as well as by secondary actions that could be taken by NPS staff to manage visitor impacts. Direct visitor impacts include displacement and collection of artifacts, damage to petroglyphs from touching or tracing, destabilization of standing walls by sitting and climbing on them, and increasing rates of erosion caused by soil trampling and social trailing. NPS actions could include stabilizing walls to withstand visitor impacts, which alters the original architectural fabric of the ruins, or constructing trails or physical barriers, which could result in disturbance of archeological deposits.

At least 50 archeological sites would be subject to visitation impacts through guided tours, excluding those sites in the recently acquired lands. Numbers of sites that would be impacted by natural area recreation and visitor use in areas adjoining the north rim scenic drive are unknown, because these new lands have not

been inventoried. In the short run, guided hikes in the First Fort area would result in the creation of new trails to and through archeological sites. Over the long term, trails would need to be formalized in the First Fort area to minimize impacts from erosion and social trailing. Moderate adverse impacts to archeological site integrity could result from cumulative loss of surface artifacts, increased soil compaction, social trailing and erosion, graffiti, a possible increase in illegal excavation of sites (as locations of sites become widely known), and from NPS actions that are subsequently taken to mitigate these various impacts. Some of the adverse impacts to archeological resources could be partially offset by the intensive, person-to-person education of visitors participating in guided adventures. Over the long term, however, the cumulative effects of providing additional visitor access to such a larger number of nonrenewable archeological resources would be major and adverse.

In addition to the impacts noted above, an estimated additional 6 to 10 sites would probably require excavation and/or stabilization within the expanded Extended Learning Zones to accommodate new trails, waysides, rest rooms, and so forth.

CUMULATIVE EFFECTS

Cumulative effects would be the same as described for the No-Action Alternative, with the following exceptions:

Past management strategies have limited visitor impacts at archeological sites to eight heavily stabilized sites on the Island and Rim Trails, and since 1987, to five partially stabilized sites on the Ranger Cabin/Ledge Trail. Implementation of Alternative 1

would open up dozens of additional sites to visitation. Incremental impacts from increased visitation would eventually result in loss of artifacts, destabilization of walls, increased soil compaction and erosion, and increased social trailing and erosion. Some of these impacts could be mitigated through stabilizing site architecture, rehabilitating social trails, and/or systematically collecting surface artifacts; however, the long-term implications of these management actions would detrimentally affect site integrity. In addition, an estimated 10-20 sites would be impacted or obliterated as a result of construction of new facilities, roads, and trails. These impacts would require mitigation through some form of data recovery.

CONCLUSION

Alternative 1 would have a major long-term adverse effect on at least 20% of the archeological resources (60-70 archeological sites) in the monument. This adverse effect would be offset to some degree by benefits derived from visitors receiving more education and an enhanced appreciation of the resources from expanded interpretive media and from participating in guided adventures. However, the net effect would be a significant increase in the degradation of sensitive archeological resources caused by construction of the north rim scenic drive and the increased visitor access to backcountry resources, and the inevitable impacts that would result from increasing visitation to archeological sites. The direct, indirect and cumulative impacts of Alternative 1 would have a major long-term adverse effect on archeological resources in the monument. In addition to those mentioned, there would be other, less

severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

The visitor center and administrative offices would be relocated to I-40 under this alternative. Construction of new facilities could impact or destroy an unknown number of archeological resources. The exact number of archeological resources that would be affected by proposed developments is unknown, because archeological surveys have not been completed for all areas of the monument, but the number is expected to be very low, if any at all are affected. Loss of resources could be partially mitigated through excavation, documentation and curation.

From a management standpoint, the relocation of visitor orientation functions to a larger visitor center near I-40 could enhance long-term integrity of archeological resources by providing visitors with more education about the importance/significance/fragility of cultural resources and means of reducing their impacts on them

before they have a chance to come in contact with them. On the other hand, relocation of visitor center/administrative offices could have a long-term moderate adverse effect by decreasing uniformed presence in proximity to the archeological sites and slowing ranger response time to resource violations. The presence of uniformed personnel has been demonstrated to be an effective deterrent to inappropriate behaviors that result in resource damage. Thus, the frequency and extent of damage to resources could be greater under this alternative than if the visitor center were to remain at its current location on the rim.

Physical removal of the Mission 66 addition to the visitor center would have no effect on archeological resources. Rehabilitating the area where the nonhistoric portion of the visitor center currently stands also would not affect archeological resources.

The addition of guided hikes in the eastern portion of the monument and expansion of the Extended Learning Zone to include the rim area west of visitor center would subject more cultural resources to visitation damage and increase the need for mitigation of impacts. Within the Extended Learning Zone, a moderate loss of integrity to approximately 6-12 archeological resources would occur because of increased visitation and the need to stabilize sites and/or harden and expand trails to accommodate more intensive use. These impacts could be partially mitigated through excavation and long-term curation. Expansion of the Extended Learning Zone would also require increased preservation maintenance and hardening of at

least six sites to accommodate increased visitor traffic and use.

An unknown number of archeological sites (but at least 8) would be impacted by increased visitation in the eastern canyon through the implementation of guided adventures in an area where none currently occur. Visitation impacts could include loss of artifacts, increased soil compaction, trailing and erosion, plus the need to stabilize structures to withstand repeated visitation. Impacts could also include increased graffiti and other forms of vandalism, as the sites and means of access to them become known to the public. These effects on the resource would be moderately adverse over the long term. On the other hand, increased impacts could be offset to some extent by greater public awareness of resource issues and impacts acquired through participating in guided adventures and by an increased NPS presence in the eastern monument.

Closure of the entrance road at night would lessen impacts to archeological sites along the entrance road from off-road vehicular traffic, evening picnickers, and illegal campers. There would be no change from existing condition in terms of impacts in other areas of the park, because these areas are already closed to the public.

CUMULATIVE EFFECTS

Cumulative impacts would be the same as those identified for the No-Action Alternative, with the following exceptions:

Past management strategies have limited visitor impacts at archeological sites to eight heavily stabilized sites on the Island and Rim Trails and, since 1987, to five partially stabilized sites on the Ranger Cabin/Ledge Trail. Implementation of Alternative 2

would open up at least eight additional sites to visitation impacts. In addition, approximately six sites would require stabilization and routine preservation maintenance to accommodate increased visitation in the expanded Extended Learning Zone. Alternative 2 would have a long-term moderate adverse effect on at least 14 archeological sites. Adverse impacts would be offset to some degree by benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in interpretive programs. However, relative to existing conditions, the net effect would be a moderate increase in the degradation of sensitive archeological resources caused by increased visitor access and associated visitation impacts, plus loss of site integrity from increased preservation maintenance and the inevitable need for future modifications of the landscape (i.e., designated trails) to accommodate visitor use in additional areas.

CONCLUSION

Alternative 2 would result in moderately adverse long-term effects to approximately 14-20 archeological resources as a result of implementing this alternative. There would be an overall reduction of archeological integrity at these sites, but not to the extent that the resources would become ineligible for listing in the National Register of Historic Places. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for

Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

As described under Unavoidable Adverse Effects (below), the continuing use of existing visitor centers and trails would directly and indirectly affect archeological resources in the immediate vicinity. Archeological resources adjacent to, or easily accessible from, public areas would continue to be vulnerable to surface disturbance, inadvertent damage, soil compaction, removal of artifacts, and vandalism. A loss of the surface archeological materials, alteration of artifact distribution, and a reduction of contextual evidence would result. However, the most heavily impacted front country sites are already documented, so, although the actual artifacts and contextual evidence are lost, information is retained through drawings, photographs, and reports. Overall, the effects of the No-Action Alternative would be moderately beneficial for maintaining the long-term integrity of the majority of archeological resources in the monument, because visitor impacts would continue to be concentrated at the previously stabilized front country sites. The remaining resources would continue to be protected in areas of the monument that are closed to public use.

Alternative 1 would have a long-term adverse effect on an estimated 20% of the archeological resources in the monument, which would be offset to some degree by benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in interpretive programs. However, the net effect would be a major increase in the degradation of sensitive archeological resources caused by the construction of the north rim scenic drive and the increased visitor access to numerous additional backcountry resources and the inevitable impacts that result from increasing visitation to archeological sites. The cumulative impact of Alternative 1 would be a major long-term adverse effect to archeological resources in the monument, some of which would be irreversible.

Alternative 2 would not result in a major adverse effect to archeological resources. There would be some moderately adverse long-term effects to archeological resources as a result of this alternative.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

Although there would be short-term effects on archeological resources caused by construction activities under all action alternatives, data recovery efforts would limit the long-term loss of the site information.

Unavoidable Adverse Impacts

Under the No-Action Alternative, the continuing use of existing visitor centers and trails would directly and indirectly affect archeological

resources in the immediate vicinity. Archeological resources adjacent to, or easily accessible from, public areas would continue to be vulnerable to surface disturbance, soil compaction, inadvertent damage, artifact collection and vandalism. Impacts to archeological sites from inappropriate visitor activities (artifact collection, graffiti, etc.) would continue to be a major long-term problem at the front country and some backcountry sites. Overall, however, the effects of the No-Action Alternative would be moderately beneficial to the long-term integrity of the archeological resources.

Alternative 1 would have a long-term adverse effect on an estimated 20% of the archeological resources in the monument, which would be offset to some degree by benefits derived from visitors receiving more education and an enhanced appreciation of the resources from participating in interpretive programs. However, the net effect would be a major increase in the degradation of sensitive archeological resources caused by construction of the north rim scenic drive, increased visitor access to backcountry resources and the inevitable impacts that result from increasing visitation to archeological sites. The cumulative impact of Alternative 1 would be a major long-term adverse effect to archeological resources in the monument.

Alternative 2 would not result in a major adverse effect to archeological resources. There would be moderately adverse long-term effects to some archeological resources as a result of this alternative, but none would be compromised to the extent that the sites would no longer be eligible for listing on the National Register.

HISTORIC CHARACTER OF THE BUILT ENVIRONMENT

Methodology

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places. The assessment of impacts to the cultural resources followed a three-step process: (1) determining the area of potential effect of the proposed actions; (2) identifying the cultural resources within the area of potential effect that are either listed in or eligible for listing in the National Register of Historic Places (see Affected Environment); and (3) assessing the extent and type of impacts the proposed action may have upon cultural resources. An impact on a cultural resource occurs if an action has the potential of altering in any way the characteristics that qualify the resource for inclusion in the National Register. If a proposed action diminishes the integrity of such characteristics, it is considered to have an adverse effect. Impacts may occur later than, or at a distance from the location of a proposed action are also potential impacts of the action, and are considered to be indirect impacts.

For the purposes of this analysis the following will be used to describe the intensity of impacts to the built environment and cultural landscapes at Walnut Canyon National Monument:

Negligible: The impact is at the lowest levels of detection, barely perceptible, and not measurable.

Minor: The impact is slight, but detectable. The impact does not affect the character defining features of a National Register of Historic

Places eligible or listed historic structure, cultural landscape, or historic district.

Moderate: The impact is readily apparent. For a National Register eligible or listed historic structure, cultural landscape, or historic district, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized.

Major: The impact is severe or of exceptional benefit. For a National Register eligible or listed historic structure, cultural landscape, or historic district, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible or listed in the National Register.

Effects of No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

The Mission 66 visitor center addition has a long-term moderate, adverse impact on the CCC visitor center. During Mission 66 construction a portion of the CCC visitor center roof was altered to accommodate the addition, and interior modifications changed the configuration of the small space for offices and a lunchroom. In the 1970s a pitched roof was added to the remaining portion of the CCC visitor center and to the Mission 66 addition. Although the CCC visitor center was modified extensively, it may yet be eligible for listing in the National Register.

The ranger cabin and the CCC and Mission 66 facilities have a long-term

moderate adverse visual impact on the prehistoric cultural landscape. However, the CCC buildings were designed and constructed of native material to blend with the natural and historic setting partially mitigating the visual impact. Ranger cabin is located at a distance from the CCC and Mission 66 developed areas; consequently, they do not impact the ranger cabin landscape. The Mission 66 designed landscape has a long-term moderate adverse visual impact on the CCC landscape, primarily from the construction of a large maintenance facility within view of the CCC ranger residences. The Mission 66 houses were constructed to blend with the natural surroundings. More recently a trailer house was added to the housing area adjacent to the CCC residences, creating a long-term moderate adverse visual impact to that landscape.

Installation of new wayside exhibits would have a minor visual impact on the cultural landscapes (prehistoric and CCC cultural landscape and Mission 66 cultural landscape). To mitigate the impact, signs would be constructed of material that is compatible with the historic setting and/or the natural surroundings, as appropriate.

Installation of new exhibits in the Mission 66 visitor center would have long-term minor adverse impact by changing the planned Mission 66 visitor center circulation pattern. However, the new exhibits would not adversely affect any character defining features of the structure's interior. If any materials were removed during rehabilitation, they would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future

preservation work at the site. All work would be undertaken in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (1995).

Facilities would be upgraded to accommodate and meet current accessibility standards. Making historic buildings and structures accessible to the mobility impaired could result in the loss of historic fabric or the introduction of new visual and nonhistoric elements, resulting in long-term minor adverse effects. For example, the doorways of buildings could require widening and ramps or wheelchair lifts could be added to the exterior of buildings. The park would strive, however, to develop design solutions to accessibility requirements that minimize impacts to cultural resources.

Fencing the boundary of the new lands of the monument would have a long-term minor, adverse visual impact on the surrounding prehistoric landscape, and could damage landscape features (e.g., agricultural alignments etc.). To partially mitigate the visual impact and the damage to landscape features, the fence would be sited to avoid as many landscape features as possible and be constructed of material compatible with the natural setting.

CUMULATIVE EFFECTS

The park boundaries represent the geographic area in which cumulative impacts that affect the built environment and cultural landscapes of Walnut Canyon National Monument were identified.

Past development has altered the prehistoric landscape and the CCC built environment. However, only minor modifications have been made to the Mission 66 designed landscape.

Ranger cabin was constructed in 1904 as a ranger residence/visitor contact station and included several outbuildings and gardens. The cabin was constructed in a prehistoric agricultural area. The CCC constructed a small visitor center, detached rest rooms, the Island Trail, two ranger residences, and a maintenance building in the late 1930s and early 1940s. The CCC maintenance building has since burned down. More recently, stand-alone garages were constructed adjacent to the CCC structures, creating a long-term moderate adverse visual impact to the planned CCC residential area. During the Mission 66 program a visitor center was constructed and attached to the existing CCC visitor center, obscuring the smaller rustic structure. Two houses, a maintenance building, storage area, and the Rim Trail were also constructed as part of the Mission 66 program. A new entrance road and parking area at the visitor center were redesigned. Modifications to the Mission 66 designed landscape include the addition of a pitched roof to both the CCC and Mission 66 portions of the visitor center, construction of a book sales area at the rear of the visitor center, installation of wheelchair lifts, and construction of an accessible rest room adjacent to the Mission 66 addition. The addition of the pitched roof and accessible rest room is a long-term moderate, adverse visual impact to the prehistoric cultural landscape of the canyon. The pitched roof detracts from both the Mission 66 and CCC visitor centers, originally constructed with flat roofs to blend with the canyon setting. The Rim Trail would be upgraded to accommodate and meet current accessibility standards. The majority of the trail would remain the same; however, new sections of

the trail would be constructed in areas not previously disturbed. To reduce the long-term moderate, adverse visual impact to the surrounding prehistoric landscape and Mission 66 landscape, new sections of the trail, would be constructed of materials compatible with the natural surrounding and historic setting. Because the primary, original design elements of the Mission 66 designed landscape are still intact, the landscape is considered to be potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the designed landscape and to historic structures could bring the integrity of the landscape and structures as a whole (especially design) down to the level where National Register eligibility would be questioned.

The CCC built environment and the prehistoric cultural landscape have been extensively modified by the Mission 66 development. The CCC cultural landscape included a small rustic visitor center, outbuildings, two residences and a maintenance shed. The Mission 66 development included a new entrance road where visitors could drive to the canyon rim and see the canyon from an expanded visitor center, parking area, and the Rim Trail. Two ranger residences and a large maintenance facility were constructed in the CCC housing area. Construction of the Mission 66 facilities created a long-term moderate, adverse visual impact on the intimate planned CCC landscape. Construction of the ranger cabin and associated outbuildings, the CCC residences, visitor center, trail and maintenance building, and the Mission 66 development have damaged or destroyed prehistoric landscape features and create a long-

term moderate, adverse visual impact on the prehistoric landscape. The ranger cabin and CCC developments were limited in size and were constructed of native materials blending with the natural setting. The Mission 66 development and more recent changes, including the addition of a trailer house and the accessible rest room, were not designed to blend with the setting, and consequently, have a long-term moderate, adverse visual impact on the natural setting. Because these landscapes have not been evaluated, it is difficult to determine National Register eligibility. However, because the primary design elements of the CCC landscape and primary, original features of the prehistoric cultural landscape remain intact, the landscapes are considered to be potentially National Register eligible.

CONCLUSION

This alternative would have minor to moderate long-term visual impacts on the prehistoric and CCC landscapes, and a long-term moderate, adverse impact on the CCC visitor center. There would be an overall reduction of integrity in the prehistoric and CCC landscapes, but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places.

Any future alterations to the prehistoric, CCC or Mission 66 landscapes, in conjunction with the minor to moderate cumulative impacts of previous changes and this alternative, could result in moderate cumulative impacts to the prehistoric, CCC and Mission 66 landscapes.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing

legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Impacts resulting from installation of waysides and exhibits and upgrade of facilities to accommodate accessibility would be the same as identified under the No-Action Alternative.

Impacts to the CCC and Mission 66 housing and maintenance area would be the same as described for the No-Action Alternative.

Impacts resulting from installation of a boundary fence would be the same as those described for the No-Action Alternative.

Construction of a new parking area south of FR303, construction of orientation waysides, and installation of a gate at the intersection of FR303 and the park road would have long-term moderate, adverse visual impacts on the surrounding prehistoric cultural landscape. To partially mitigate the impact, the parking lot, orientation exhibits, and gate would be situated to reduce visual impacts and would be constructed of materials that are compatible with the natural surroundings.

Construction of administrative offices would have long-term moderate, adverse impacts to the prehistoric cultural landscape by damaging or

destroying landscape features and would have long-term moderate visual impacts as well. The administrative offices would be sited to avoid as many landscape features as possible and situated to reduce visual impact. The administrative office would be constructed of materials that are compatible with the natural surroundings.

Adaptively rehabilitating the visitor center building would neither significantly alter the present form or character of the structure's exterior nor adversely affect any significant character defining features of the structure's interior. If any materials were removed during rehabilitation, they would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work at the site. All rehabilitation work would be undertaken in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (1995). Converting the visitor center to accommodate visitor orientation, new exhibits, and group presentations would have a long-term moderate impact on the building.

Upgrading the existing primitive road along the north rim to accommodate motorized sightseeing would have long-term moderate adverse impacts on the prehistoric cultural landscape by damaging or destroying landscape features. The road would need to be graded and widened, which could damage field houses and associated agricultural features that may be adjacent to the road, or previously cut through by the road. However, the road would be designed to avoid as many landscape features as possible and would be constructed of materials that are compatible with

the natural surroundings. Installation of new wayside exhibits along the scenic drive would have minor long-term visual impacts to the prehistoric landscape. To partially mitigate the visual impact, signs would be designed and constructed of material compatible with the natural surroundings. Constructing the scenic drive to the east end of the monument would have long-term moderate, adverse impact on the planned Mission 66 experience by changing the way visitors currently see Walnut Canyon. The Mission 66 designed experience brought visitors to the edge of the canyon, to leave their cars behind and experience the canyon by foot in a quiet natural setting. The new scenic drive would create a motorized visit disturbing the tranquility (and the feeling of isolation) of the canyon.

Constructing a new pullout (and possible entrance station) and/or turnaround at the junction of I-40 and the park road would have long-term moderate adverse visual impact on the surrounding prehistoric cultural landscape. The pullout and entrance station would be situated to reduce visual impact and would be constructed of materials that are compatible with the natural surroundings.

Construction of a trail to First Fort would have long-term moderate impacts on the prehistoric cultural landscape by damaging or destroying landscape features. However, the trail would be designed to avoid as many landscape features as possible and would be constructed of material compatible with the natural surrounding and historic setting. Installation of new wayside exhibits along the trail would have minor long-term adverse visual impacts to

the surrounding prehistoric landscape. Like the trail, the signs would be constructed of material compatible with the natural and historic setting.

Formalizing a trail to ranger cabin using the existing primitive road would have a long-term moderate, adverse visual impact on the surrounding prehistoric landscape. The trail would be hardened and delineated to direct visitors to the cabin. The trail would be designed to blend with the natural setting to reduce the visual impact. Installing wayside exhibits along the trail would have long-term moderate visual impacts. To mitigate the visual impacts, signs would be constructed of material compatible with the natural surrounding and historic setting.

Formalizing a trail to ranger cabin using the existing primitive road would have a long-term minor, adverse impact on the historic ranger cabin landscape. The trail would be hardened and delineated to direct visitors to the cabin. The trail would be designed to blend with the historic setting to partially mitigate the visual impact. Installing wayside exhibits along the trail to the cabin would have long-term minor, adverse visual impact on the historic setting. To partially mitigate the impact, the signs would be constructed of material compatible with the historic setting.

CUMULATIVE EFFECTS

Past and more recent development has altered the prehistoric landscape, the ranger cabin landscape and the CCC built environment. However, only minor modifications have been made to the Mission 66 designed landscape. Ranger cabin was constructed in 1904 as a ranger residence/visitor contact

station and included several outbuildings and gardens. The cabin was constructed in a prehistoric agricultural area. The CCC constructed a small visitor center, detached rest rooms, the Island Trail, two ranger residences, and maintenance building in the late 1930s and early 1940s east of ranger cabin. The CCC maintenance building has since burned down. More recently stand-alone garages were constructed adjacent to the CCC structures creating a long-term moderate adverse visual impact to the planned CCC residential area. During the Mission 66 program a visitor center was constructed and attached to the existing CCC visitor center, obscuring the smaller rustic structure. Two houses, a maintenance building, storage area, and the Rim Trail were also constructed as part of the Mission 66 program. A new entrance road and parking area at the visitor center were redesigned. Modifications to the Mission 66 designed landscape include the addition of a pitched roof to both the CCC and Mission 66 portions of the visitor center, construction of a book sales area at the rear of the visitor center, installation of wheelchair lifts, and construction of an accessible rest room adjacent to the Mission 66 addition. The addition of the pitched roof and accessible rest room is a long-term moderate, adverse visual impact to the prehistoric cultural landscape of the canyon. The pitched roof detracts from both the Mission 66 and CCC visitor centers, originally constructed with flat roofs to blend with the canyon setting. The Rim Trail would be upgraded to accommodate and meet current accessibility standards. The majority of the trail would remain the same; however, new sections of the trail would be constructed in areas not previously disturbed. To

reduce the long-term moderate, adverse visual impact to the surrounding prehistoric landscape, CCC landscape, and Mission 66 landscape, new sections of the trail, would be constructed of materials compatible with the natural surrounding and historic setting. Because the primary, original design elements of the ranger cabin landscape, CCC and Mission 66 designed landscapes are still intact, and the original primary features of the prehistoric landscape are still intact, the landscapes are considered to be potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the landscapes and to historic structures could bring the integrity of the landscapes and structures as a whole (especially design) down to the level where National Register eligibility would be questioned.

Historical uses of the east end of the monument, including grazing, logging, and construction of the Santa Fe dam in the late 1800s, have had a long-term moderate, adverse impact on the prehistoric cultural landscape. Construction of logging roads, railroad grades and the Santa Fe dam damaged or destroyed prehistoric landscape features (field houses, agricultural features). Although the above modifications to the east end of the monument have taken place, the majority of primary features (prehistoric landscape features) remain intact; consequently, the prehistoric landscape is considered potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the prehistoric landscape beyond the scope of what is proposed in this alternative could bring the integrity of the landscape as

a whole down to the level where National Register eligibility would be questioned.

CONCLUSION

This alternative would have long-term moderate, adverse impacts on the prehistoric landscape and long-term moderate adverse impacts on the CCC/Mission 66 visitor center. There would be an overall reduction of historic integrity of the prehistoric landscape and the CCC/Mission 66 visitor center, but not to the extent that they would no longer be potentially eligible to be listed in the National Register of Historic Places. Any future alterations to the prehistoric landscape or the visitor center, in conjunction with the moderate, adverse cumulative impacts of previous changes and this alternative could result in moderate, adverse cumulative impacts to the prehistoric landscape and the CCC/Mission 66 visitor center.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2: (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Impacts resulting from installation of waysides and exhibits and upgrade of facilities to accommodate accessibility would be the same as those described for the No-Action Alternative.

Impacts to the CCC and Mission 66 housing and maintenance area would be the same as those described for the No-Action Alternative.

Impacts resulting from installation of a boundary fence would be the same as those described in the No-Action Alternative.

Construction of a new visitor center at the junction of I-40 and the park entrance road would have long-term moderate impact on prehistoric landscape features and long-term moderate visual impact on the surrounding landscape. To partially mitigate the impacts the visitor center would be sited to avoid as many landscape features as possible and be constructed of material compatible with the natural surroundings.

Removing the Mission 66 portion of the visitor center would have long-term moderate beneficial impact on the CCC visitor center. The Mission 66 portion of the visitor center, including recent additions of the pitched roof and book sales area obscure the small, rustic structure. Removing the Mission 66 portion of the visitor center and the pitched roof would remove the long-term moderate, adverse visual impact on the prehistoric landscape of the canyon. The CCC structure was constructed to blend with the setting, and is not visible from the Island Trail. Adaptively rehabilitating the CCC

visitor center would neither significantly alter the present form or character of the structure's exterior nor adversely affect any significant character defining features of the structure's interior. If any materials were removed during rehabilitation, they would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work at the site. All rehabilitation work would be undertaken in accordance with the Secretary of the Interior's Standards for Treatment of Historic Properties (1995). Converting the visitor center to accommodate educational activities and offices would have a long-term minor to moderate impact on the building. Removing the Mission 66 portion of the visitor center would have a long-term moderate adverse impact on the planned Mission 66 experience and designed landscape.

Installation of gates at the junction of the park entrance road and I-40 and on either side of FR303 would have long-term minor visual impact on the surrounding prehistoric landscape. To reduce the visual impact the gates would be constructed of material compatible with the natural and cultural setting.

Formalizing a trail to ranger cabin using the existing primitive road would have a long-term moderate, adverse visual impact on the surrounding prehistoric landscape. The trail would be hardened and delineated to direct visitors to the cabin. The trail would be designed to blend with the natural setting to reduce the visual impact. Installing wayside exhibits along the trail would have long-term moderate visual impacts. To mitigate the visual impacts, signs would be constructed

of material compatible with the natural surrounding and historic setting.

Formalizing a trail to ranger cabin using the existing primitive road would have a long-term minor, adverse impact on the historic ranger cabin landscape. The trail would be hardened and delineated to direct visitors to the cabin. The trail would be designed to blend with the historic setting to partially mitigate the visual impact. Installing wayside exhibits along the trail to the cabin would have long-term minor, adverse visual impact on the historic setting. To partially mitigate the impact, the signs would be constructed of material compatible with the historic setting.

Construction of a parking area and trail in the east end of the monument would have long-term moderate, adverse impact on prehistoric landscape features by damaging or destroying field houses and agricultural features. Construction of the trail and parking area would also have long-term moderate adverse visual impact on the surrounding prehistoric landscape. To reduce the adverse impacts, the parking area would be sited to avoid as many features as possible and the trail would be constructed of material compatible with the natural surrounding.

CUMULATIVE EFFECTS

Past development has altered the prehistoric landscape and the CCC built environment. However, only minor modifications have been made to the Mission 66 designed landscape. Ranger cabin was constructed in 1904 as a ranger residence/visitor contact station and included several outbuildings and gardens. The cabin

was constructed in a prehistoric agricultural area. The CCC constructed a small visitor center, detached rest rooms, the Island Trail, two ranger residences, and a maintenance building in the late 1930s and early 1940s. The CCC maintenance building has since burned down. More recently stand-alone garages were constructed adjacent to the CCC structures creating a long-term moderate adverse visual impact to the planned CCC residential area. During the Mission 66 program a visitor center was constructed and attached to the existing CCC visitor center, obscuring the smaller rustic structure. Two houses, a maintenance building, storage area, and the Rim Trail were also constructed as part of the Mission 66 program. A new entrance road and parking area at the visitor center were redesigned. Modifications to the Mission 66 designed landscape include the addition of a pitched roof to both the CCC and Mission 66 portions of the visitor center, construction of a book sales area at the rear of the visitor center, installation of wheelchair lifts, and construction of an accessible rest room adjacent to the Mission 66 addition. The addition of the pitched roof and accessible rest room is a long-term moderate, adverse visual impact to the prehistoric cultural landscape of the canyon. The pitched roof detracts from both the Mission 66 and CCC visitor centers, originally constructed with flat roofs to blend with the canyon setting. The Rim Trail would be upgraded to accommodate and meet current accessibility standards. The majority of the trail will remain the same; however, new sections of the trail would be constructed in areas not previously disturbed. To reduce the long-term moderate, adverse visual impact to the

surrounding prehistoric landscape and Mission 66 landscape, new sections of the trail, will be constructed of materials compatible with the natural surrounding and historic setting. Because the primary, original design elements of the Mission 66 designed landscape are still intact, the landscape is considered to be potentially National Register eligible (however, this landscape has yet to be formally evaluated). Any future alterations of the designed landscape and to historic structures could bring the integrity of the landscape and structures as a whole (especially design) down to the level where National Register eligibility would be questioned.

Cumulative impacts to the Mission 66 landscape would be the same as described for the No-Action Alternative, but with the following changes. Any future alterations of the designed landscape, in conjunction with the adverse impacts of both past changes and this alternative, would bring the integrity of the landscape as a whole (especially design) down to the level where it is no longer National Register eligible. However, this landscape has not yet been formally evaluated. The long-term major, adverse impacts and most importantly, any potential impacts of future actions could result in major, adverse cumulative impacts to the Mission 66 designed landscape.

Cumulative impacts to the CCC landscape would be the same as described for the No-Action Alternative, but with the following changes. Removing the Mission 66 portion of the visitor center from the smaller, rustic CCC visitor center would have a major long-term benefit to the CCC visitor center by returning

the developed area to a more intimate setting.

Because few alterations have occurred to the ranger cabin landscape, the landscape is considered potentially National Register eligible (however, this landscape has not yet been formally evaluated). Any future alterations of the ranger cabin landscape beyond the scope of what is proposed in this alternative could bring the integrity of the landscape as a whole down to the level where National Register eligibility would be questioned.

Cumulative impacts to the prehistoric landscape would be the same as those described for the No-Action Alternative, but with the following changes. Removing the Mission 66 portion of the visitor center from the CCC visitor center would reduce the visual impact of the visitor center from the prehistoric landscape of the canyon. Because the primary design elements of the prehistoric landscape of the monument remain in tact, the landscape is considered to be potentially National Register eligible.

CONCLUSION

This alternative would have long-term moderate adverse impacts on the prehistoric landscape, the ranger cabin landscape, and the Mission 66 landscape. However, this alternative would also have long-term major benefit to the prehistoric landscape by removing the Mission 66 portion of the visitor center and reducing the visual impact to the prehistoric canyon landscape. There would also be a long-term major benefit to the CCC visitor center by returning the developed area to a more intimate, rustic setting. There would, however, be an overall reduction of historic integrity in the landscapes

(prehistoric, ranger cabin, CCC and Mission 66), but not to the extent that they would no longer be eligible to be listed in the National Register of Historic Places. Any future alterations of the landscapes, in conjunction with the adverse cumulative impacts of previous changes and the preferred alternative, could result in major, adverse cumulative impacts to each landscape.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

There would be an irreversible/irretrievable commitment of resources under Alternative 2. The Mission 66 portion of the visitor center would be removed.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

The continuing lack of a cultural landscape inventory would lead to a long-term loss of the integrity of these resources.

Unavoidable Adverse Impacts

The No-Action Alternative would have long-term moderate, adverse impact on the prehistoric cultural landscape from past development (ranger cabin, CCC, Mission 66 and from more recent alterations). There would be a long-term minor, adverse impact to all landscapes (prehistoric, ranger cabin, CCC and Mission 66) from installation of new wayside exhibits. There would be a long-term minor, adverse impact to upgrade historic facilities (CCC and Mission 66) to accommodate and meet current accessibility standards.

Alternative 1 would have the same long-term moderate, adverse impacts to the prehistoric cultural landscape from past development including ranger cabin, CCC, Mission 66 and recent alterations). There would be long-term minor and moderate, adverse visual impacts to all landscapes from installation of new wayside exhibits. Construction of administrative offices and a new parking area south of FR303 would have long-term moderate, adverse impact on the surrounding prehistoric landscape and would damage or destroy landscape features (such as field houses and associated agricultural alignments). Converting the visitor center to accommodate large group presentations and new exhibits would have long-term moderate, adverse impact on the historic structure, but would not affect any character defining features. Trail construction to the ranger cabin area would have long-term moderate, adverse visual impacts on the prehistoric landscape surrounding the cabin, but would have long-term minor, adverse visual impact on the ranger cabin landscape. Formalizing a scenic drive to the east end of the

monument would have long-term moderate, adverse visual impact on the surrounding prehistoric landscape, and would have long-term moderate, adverse impact on the planned Mission 66 drive-up, park, and see the park on foot experience. Motorized sightseeing would disrupt the quiet of the canyon setting.

Alternative 2 would have the same long-term moderate, adverse impacts to the prehistoric cultural landscape from past development including ranger cabin, CCC, Mission 66 and recent alterations). There would be long-term minor and moderate, adverse visual impacts to all landscapes from installation of new wayside exhibits. Construction of a new visitor center at the junction of I-40 and the park entrance road would have long-term moderate, adverse visual impact on the surrounding cultural landscape, and could damage or destroy landscape features (field houses and associated agricultural alignments). Removing the Mission 66 portion of the visitor center would have long-term moderate, adverse impact on the planned Mission 66 experience by eliminating the observation room. Trail construction to the ranger cabin area would have long-term moderate, adverse visual impacts on the prehistoric landscape surrounding the cabin, but would have long-term minor, adverse visual impact on the ranger cabin landscape. Construction of a parking area and trail at the east end of the monument would have long-term moderate, adverse visual impact on the surrounding prehistoric landscape, and would damage or destroy prehistoric landscape features.

LONG-TERM INTEGRITY OF ETHNOGRAPHIC RESOURCES

Methodology

Ethnographic resources are those cultural and natural resources to which park-associated communities ascribe cultural significance and that continue to play a role in a community's identity and way of life. Only members of the communities to whom the resources hold cultural value can determine ethnographic resources and potential impacts to them. After initial consultation meetings with representatives of several American Indian tribes having possible traditional associations with park lands and resources, the tribes determined that the Hopi, Zuni, and Navajo Tribes have the closest association with resources that could be affected by various management alternatives. The National Park Service entered into small contracts with each of these tribes to visit the parks and identify culturally significant resources that might be affected by various management alternatives. The Hopi, Zuni, and Navajo Tribes submitted information on ethnographic resources concerns to the National Park Service and participated in the GMP planning process during all stages of development. Because the ethnographic resources identified by the tribes are important in each tribe's history, and because the resources are interconnected with places and resources located throughout customary tribal lands, any impacts to ethnographic resources would be regional in scope. In addition, because ethnographic resources are tied to communities' cultural identities, effects to the resources also have an effect on the

communities to which they are tied in perpetuity. Therefore, the duration of impacts to ethnographic resources is forever. Although the tribes themselves did not identify the intensity of potential impacts to ethnographic resources, the National Park Service defines intensity as follows:

Negligible: The impact is at the lower levels of detection.

Minor: The impact is slight, but detectable.

Moderate: The impact is readily apparent.

Major: The impact is severely adverse or exceptionally beneficial.

Any adverse impacts to ethnographic resources would be readily apparent to the tribes to whom the resources hold cultural significance, and in most cases, because impacts to these resources affect cultural identity and ways of life, most adverse impacts would be considered severely adverse. Therefore, most impacts to ethnographic resources, whether beneficial or adverse, would be moderate to major.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Tribal representatives have identified all pre-Columbian archeological sites at Walnut Canyon as ethnographic resources that are important in tribal histories and cultural identities. Any adverse impacts that presently occur to archeological sites as a result of vandalism owing to visitor access would continue to constitute moderate to major adverse effects to ethnographic resources. Conversely, any protection to archeological sites

that is currently afforded by lack of visitor access constitutes a major beneficial effect to archeological sites as ethnographic resources.

A moderate to major adverse effect to ethnographic resources could continue under the No-Action Alternative, only to the extent that tribal access to culturally significant resources or places for traditional cultural purposes is limited by the presence of visitors. Conversely, existing conditions for tribal access to ethnographic resources that would continue under the No-Action Alternative would constitute a moderate to major beneficial effect. Adverse effects would be minimized by consultation with associated tribes and continued tribal access to ethnographic resources for traditional cultural purposes.

Moderate to major beneficial effects to ethnographic resources would occur under the No-Action Alternative due to the planning and design of new interpretive messages that is an action common to all alternatives. Improvements and corrections to the interpretive media about the tribal histories and cultural values to which the ethnographic resources are related will have a beneficial effect, provided that associated tribes are involved in interpretive planning.

CUMULATIVE EFFECTS

Prior to the establishment of monument boundaries, the lands encompassed by what is now Walnut Canyon National Monument were part of the customary use areas or traditional lands of several American Indian tribes. These lands included ancestral dwellings or other sites, medicinal plants, prayer offering places, homes of deities, pilgrimage

routes, or other places integral to tribal cultural identity and continuity.

With the establishment of federal land management boundaries, including Walnut Canyon National Monument, the construction of fences and the implementation of land use regulations, traditional tribal uses and treatment of resources were precluded over the years. Increased visitation interfered with ceremonial activities at certain places within monument lands. Closure of backcountry disrupted land use patterns. Stabilization of archeological sites and opening them to public visitation violated cultural values about the treatment of ancestral remains. Interpretive messages told stories of the past that differ from tribal knowledge of their own histories.

The cumulative effects of monument operations on ethnographic resources and the tribes associated with them in the past have been major and long term. Under this alternative, some impacts to ethnographic resources would continue into the future, such as the effects of stabilization and visitation, but some impacts, including those due to backcountry closures, would be improved by the development of long-term consulting relationships and agreements between the NPS and the tribes. Conversely, if backcountry closures affect tribal access to the ethnographic resources with which they are affiliated, the adverse effect would be moderate to major and long-term. Cumulative impacts would also be improved by updated interpretive stories that incorporate tribal versions of their own histories and connections to monument lands and resources.

CONCLUSION

By perpetuating the status quo, the No-Action Alternative would also perpetuate any current and ongoing moderate to major effects to ethnographic resources, both adverse and beneficial.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Any adverse effects to archeological resources as a result of this alternative would also constitute a moderate to major adverse effect to the sites as ethnographic resources. Standard archeological mitigation measures that might recover some of the archeological values of the resources do not serve to mitigate adverse effects on ethnographic values. Potential disturbance of archeological resources due to development, degradation due to high rates of visitation, or vandalism due to increased exposure of more sites to the public, would constitute a moderate to major adverse effect to ethnographic resources. Similarly, lack of tribal ability to access ethnographic resources for traditional cultural purposes due to the constant

presence of visitors would also have an adverse effect on ethnographic resources. The backcountry closures in effect under the actions common to all alternatives could have a major to moderate beneficial impact on ethnographic resources by protecting them from the effects of visitation

Moderate to major beneficial effects to ethnographic resources would occur under Alternative 1 due to the planning and design of new interpretive messages. This is an action common to all alternatives. Improvements and corrections to the interpretive media about the tribal histories and cultural values to which the ethnographic resources are related will have a beneficial effect, provided that associated tribes are involved in interpretive planning.

CUMULATIVE EFFECTS

The cumulative effects of this alternative on ethnographic resources would primarily be the moderate to major, long term, regional adverse effects of disturbance to archeological resources through increased development, increased visitation to more places, and potential for increased vandalism due to more exposure and access to ethnographically significant archeological sites. Increased visitation to more resources could also have an adverse effect on tribal access to ethnographic resources for traditional cultural purposes. Some impacts would be improved by the development of long-term consulting relationships and agreements between the NPS and the tribes. Cumulative impacts would also be improved by updated interpretive stories that incorporate tribal versions of their own histories and connections to monument lands and resources.

CONCLUSION

The effects of this alternative would be both adverse and beneficial, depending on the degree of tribal involvement in park planning. The increased impacts to archeological sites as a result of building new facilities and allowing increased visitation to numerous additional sites would also constitute a major impairment to ethnographic resources.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Overall, this alternative would have moderate to major, long-term beneficial effects on ethnographically significant archeological and natural resources from the effects of increasing visitor use and access, although any adverse effects that would result to archeological sites under this alternative would still constitute adverse effects to ethnographic resources. The preservation of untrailed expanses and unfragmented natural systems could have a moderate to major beneficial impact on ethnographic resources by protecting them from the effects of visitation. The development of updated interpretive programs and media and new in-depth learning experiences through partnerships with tribes and other entities would also have a moderate to major beneficial effect on ethnographic resources.

CUMULATIVE EFFECTS

By preserving untrailed expanses, unfragmented natural systems, and relatively pristine resource conditions throughout much of the park and

improving interpretive media and learning experiences in partnership with associated tribes, the overall cumulative effects to ethnographic resources would be moderate to major, long term, and regionally beneficial. The only adverse effects to ethnographic resources that would result from this alternative are those that would adversely affect archeological resources.

CONCLUSION

Overall, the preferred alternative would have beneficial effects on ethnographic resources. Some adverse effects, associated with archeological resources, would remain. Further consultation with the tribes may reveal that the impacts to archeological resources from this alternative are moderate, rather than major, and therefore, the potential impacts identified may not constitute an impairment to ethnographic resources.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible/irretrievable commitments of resources.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There would be no short-term gains resulting in long-term losses.

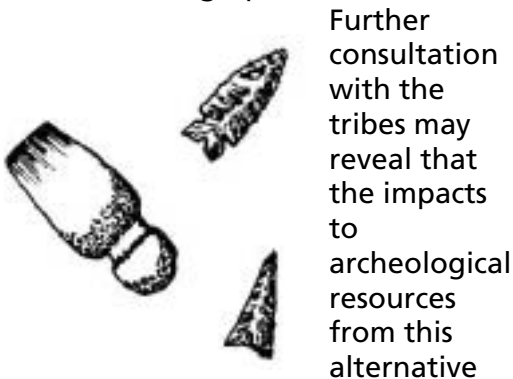
Unavoidable Adverse Impacts

Tribal representatives have identified all pre-Columbian archeological sites at Walnut Canyon as ethnographic resources that are important in tribal

histories and cultural identities. Adverse impacts that presently occur to archeological sites as a result of visitor use would continue to constitute moderate to major adverse effects to ethnographic resources.

As described under impacts to archeological resources, an estimated 20% of the archeological resources in the monument would be adversely affected under Alternative 1. Any adverse effects to archeological sites would also constitute a moderate to major effect to the sites as ethnographic resources. Further, standard archeological mitigation measures that might recover some of the archeological values of the resources would not serve to mitigate adverse effects on cultural values. Potential disturbance of archeological resources, especially involving potential disturbance to human remains, would constitute a major adverse effect to ethnographic resources and their associated cultural values.

Alternative 2 is estimated to have a long-term, detrimental effect on 14-20 archeological sites, which could constitute a long-term, major adverse effect on ethnographic resources.



Further consultation with the tribes may reveal that the impacts to archeological resources from this alternative

are moderate, rather than major, and therefore, the potential impacts identified may not constitute an impairment to ethnographic resources.

LONG-TERM INTEGRITY OF NATURAL SYSTEMS AND PROCESSES

Methodology

Available information on the natural systems of Walnut Canyon National Monument and surrounding ecosystem was reviewed, including information on geology, soils, intermittent drainage systems, vegetation, and wildlife. Potential impacts to rare species/unique habitats, and wetlands/floodplains/riparian resources within the monument are assessed in separate sections below. Physiographic maps of the monument were used to generally characterize the natural systems surrounding proposed visitor use and support facilities, and the anticipated visitor uses and administrative activities within the various management zones. The potential impacts of each alternative on those systems were then evaluated, including pertinent issues identified during the scoping process. Predictions about short- and long-term impacts were based on past studies of land use and visitor impacts to the regional ecosystem, including some studies at the monument. Sociological studies comparing the deterrent effects of signs versus ranger presence at sites were also considered. The predicted intensity of impacts is articulated according to the following criteria:

Negligible: An action that would affect very few individuals of species populations, or affect the existing natural environment within Walnut Canyon National Monument. The change would be so small or localized that it would have no measurable or perceptible consequence to the

populations or natural system function.

Minor: An action that would affect a relatively small number of individuals within species populations, or affect the existing natural environment within Walnut Canyon National Monument. The change would require considerable scientific effort to measure, be limited to relatively few individuals of the populations, be very localized in area, and have barely perceptible consequences to the populations or natural system function.

Moderate: An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a species population, (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), (3) a relatively large habitat area or important habitat attributes, or (4) a large area of the natural environment within Walnut Canyon National Monument. A species population, plant and animal communities, habitats, or natural system function might deviate from normal levels under existing conditions, but all species would remain indefinitely viable within the monument.

Major: An action that would have drastic consequences for a species population numbers, dynamics between multiple species, habitat area or important habitat attributes, or the existing natural environment within Walnut Canyon National Monument. The change would be readily apparent throughout the monument area. A species population, plant and animal communities, habitats, or natural system function would be

permanently altered from normal levels under existing conditions, and species would likely be extirpated within the monument.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative, natural systems and processes within Walnut Canyon National Monument would be allowed to continue recovering from the adverse impacts of historic logging, fire suppression, and livestock grazing. Development of new public access and use facilities would not occur, and development-related adverse impacts to soils, intermittent drainage systems, vegetation, and wildlife would be entirely avoided.

Daytime use of the paved entrance road by park visitors would continue. Most visitation occurs between the months of April and October, and between the hours of 10 a.m. and 6 p.m. Local residents occasionally use the road for other purposes year-round at any time of the day or night. Motor noise from passing vehicles frequently disturbs wildlife, and occasionally animals are killed in collisions with motor vehicles. The entrance road generally conveys most storm water flows through the natural drainage system. At a few locations, storm water is impounded on the upslope side and "jetting" erosion occurs on the downslope side of culverts, causing very local erosion and vegetation changes. Under the No-Action Alternative, continued use of the entrance road would have negligible to long-term, minor adverse impacts to soils, intermittent

ENVIRONMENTAL CONSEQUENCES

drainage systems, vegetation, and wildlife.

Approximately 180 acres, or 5%, of the total monument area is currently impacted by visitor use and NPS support infrastructure. Visitor use and NPS operations impacts to natural systems and processes are primarily concentrated around the visitor center, maintenance shop, and employee housing area near the north-central canyon rim. Routine maintenance activities, including vegetation management, are limited to the entrance road, parking lot, maintenance shop, employee housing area, and utility corridors. Two short trails provide visitor access into the canyon and along the rim within the north-central canyon area. Ranger-guided hikes also provide dispersed visitor access along the north rim area immediately west of the visitor center. Most visitor use impacts are expected to be localized to within 300 feet of the north canyon rim facilities and trails, and include trampling of vegetation, compaction of soils, development of social trails, minor alterations in drainage patterns, noise, and disturbance to wildlife. Local populations of nonnative plants also persist in heavy use areas and along trail corridors. Ongoing efforts to improve visitor orientation about appropriate behavior toward sensitive resources could mitigate some adverse visitor use impacts to natural systems and processes. Under the No-Action Alternative, long-term, minor adverse impacts from NPS operations and visitor activities would continue around interpretive areas and support facilities within the north-central canyon rim area.

Approximately 95% of the area within the monument has long remained closed to the general public

to protect sensitive cultural and natural resources. The monument has also remained closed and gated at night. This effectively minimizes human disturbance to wildlife within the canyon bottom, south rim, and tributary canyons. Occasional unauthorized hiking and other isolated natural resource impacts would continue to occur within the closed area because the existing staffing level is too low to ensure frequent patrols. Under the No-Action Alternative, continuing the backcountry closure would ensure that the integrity of natural systems and processes within the monument is preserved, and would have long-term, moderate beneficial impacts to solitary wildlife species.

Approximately 1,300 acres within the 1996 boundary expansion area would be surveyed, fenced, and posted. Until these actions are completed, these areas would continue to receive public uses similar to those under former management by the U.S. Forest Service. Predominant uses include hiking, bicycling, and horse riding. These activities are causing vegetation trampling, soils compaction, localized erosion, noise, and wildlife disturbance. Numerous unplanned trail and road segments are evident. Isolated incidents of off-road driving, firewood cutting, wildlife poaching, and trash dumping would also likely occur, which have greater adverse impacts to natural systems and processes. Livestock would continue to graze the eastern expansion area under an approved U.S. Forest Service allotment plan. Construction of a boundary fence would require the removal of a narrow strip of vegetation along the boundary line, and wildlife and soils would be disturbed along the boundary line while the fence is built.

The fence would be appropriately designed to allow wildlife to cross at existing movement corridors, which would mitigate potential long-term, adverse impacts to wildlife. The construction of the boundary fence would therefore have short-term, minor adverse impacts, while the exclusion of recreational and illegal activities within the 1996 boundary expansion areas would have long-term, minor beneficial impacts to natural systems and processes, and a long-term, moderate beneficial impact to solitary wildlife species.

During the last 10 years, the NPS has conducted several management-ignited fires in ponderosa pine vegetation on the canyon rim terraces. The fires have functioned essentially the same as presettlement natural fires to thin tree saplings, reduce the buildup of deadwood and vegetation litter, and promote healthy soils and herbaceous groundcover. The fires generate smoke and haze from the combustion of natural vegetation, but prevailing winds and climatic conditions effectively disperse smoke away from human habitation or sensitive plant and animal habitats. Past management-ignited fires have had both moderate short-term and minor long-term beneficial impacts upon natural systems and processes within the monument. The continuation of the fire management program would require preparation of a new Fire Management Plan, additional opportunities for public scoping and comment, and assessment of environmental impacts pursuant to the National Environmental Policy Act.

Under the No-Action Alternative, local infestations of nonnative plants would likely persist in disturbed areas

along road and trail corridors, developed areas, or areas of heavy visitation. The NPS would attempt to monitor and control nonnative species when warranted. Feasible control technologies are not readily available for small, annual invasive plants, and success in controlling them is generally predicated on early detection and control, or upon the availability of ecologically sound and affordable technology. The best measures to control these species are careful planning of access routes and ground-disturbing activities to minimize the potential for establishment and spread. The NPS would continue to follow established policy of prohibiting ground disturbing activities without prior assessment and mitigation of potential impacts from invasive plants. Despite these efforts, existing invasive, nonnative species would likely continue to have long-term, minor to moderate adverse impacts on soils, intermittent drainage systems, vegetation, and wildlife habitats.

CUMULATIVE EFFECTS

The geographic area used for assessing cumulative effects is the Walnut Canyon watershed.

Under the No-Action Alternative, the cumulative impacts of continuing public visitation and NPS operations at Walnut Canyon National Monument on natural systems and processes are difficult to estimate. The primary adverse cumulative impacts resulting from NPS management would likely result from failure to manage increased visitation and road traffic, or from poorly planned facilities. Over time, these circumstances would be expected to increase adverse impacts to soils, intermittent drainages, vegetation,

and wildlife. Although carrying capacity for visitor use has not been established, a threshold could be reached where the adverse impacts to natural systems and processes, especially for wildlife, exceed those stated in the analysis above.

The proximity of Walnut Canyon National Monument to the city of Flagstaff likely contributes to the local "quality of life," which influences regional population growth. The recreational aspect of the monument may therefore slightly contribute to urban development and habitat fragmentation around Flagstaff, and associated regional impacts to air and water quality, geology, soils, vegetation, wildlife, and riparian resources. However, given the diversity of public lands and recreational opportunities within the region, public enjoyment of the monument is likely not among the prominent reasons for urban growth. In this regard, the No-Action Alternative would likely have negligible cumulative impacts upon regional natural systems and processes.

Conversely, the existence of the monument as a protected area where natural systems and processes are sustained may contribute significantly to the conservation of regional natural systems and biodiversity. As time passes, Walnut Canyon should have increasing scientific value as a relatively undisturbed ecosystem from which to assess regional land use impacts. In this regard, the No-Action Alternative would have long-term, beneficial cumulative impacts to regional natural systems.

CONCLUSION

Current management of Walnut Canyon National Monument ensures

natural systems and processes would be sustained with relatively few long-term adverse environmental impacts, except for those that are attributable to increasing visitation, historic land use, and regional watershed, airshed, and ecosystem degradation. Soils, intermittent drainage systems, vegetation, and wildlife are generally stable, and inherent biodiversity is relatively intact. The NPS would manage for the continued recovery of natural systems from historic land uses and restore fire to the ecosystem.

No new visitor facilities would be developed, and related adverse impacts would be entirely avoided. Continued use of the entrance road would have negligible to long-term, minor adverse impacts to natural systems, with a greater degree of adverse impact to wildlife. NPS operations and visitor activities are causing long-term, minor adverse impacts around interpretive areas and support facilities within the north-central canyon rim area. Most of the area within the monument is closed to the general public to protect sensitive resources, which ensures the long-term integrity of natural systems and processes. Fencing the 1996 boundary expansion area would have long-term, moderate beneficial impacts to solitary wildlife species.

The availability of the monument for public enjoyment might influence regional urban development around Flagstaff and cumulative impacts to regional natural systems, but these impacts are believed to be negligible and considerably offset by the value of the monument as a long-term conservation area.

Under the No-Action Alternative, approximately 5% of the total monument area would remain impacted by visitor use and NPS

support infrastructure. The No-Action Alternative would result in no major impacts on natural systems and processes in Walnut Canyon National Monument.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Under Alternative 1, natural systems and processes within Walnut Canyon National Monument would be allowed to continue recovering from the adverse impacts of historic logging, fire suppression, and livestock grazing. The impacts of NPS operations and visitor activities around the existing north-central canyon area, and the impacts of fencing the 1996 boundary area would be the similar to those identified for the No-Action Alternative. Ongoing efforts to improve visitor orientation about appropriate behavior toward sensitive resources could mitigate some adverse visitor use impacts to natural systems and processes.

Under Alternative 1, new facilities would be developed and visitor access would be expanded to new areas. The existing entrance road would be

shortened by approximately 1/4 mile, and a new parking area would be built farther from the canyon rim; both the old portion of the entrance road and the parking area near the visitor center would be retained for handicapped parking and other administrative purposes. The park would remain closed and gated at night. Impacts to wildlife from the shortened road and new parking area would be similar to the No-Action Alternative, because existing traffic levels would continue over most of the existing entrance road, the new facilities would be in close proximity to the road, and wildlife in the vicinity is already adapted to existing traffic disturbance. Lengthening pedestrian access to the visitor center would have negligible to long-term minor adverse impacts along the pedestrian corridor, including localized vegetation trampling, soils compaction, unplanned trail development, drainage pattern interference, and nonnative plant establishment.

The installation of a new orientation facility near I-40, new parking area, and new administrative offices would require the removal of several acres of vegetation and associated loss of wildlife habitat, soils disturbance, and local disruption of drainage patterns. The NPS would be required to manage native vegetation surrounding the larger developed area, including actions such as removing individual hazard trees, which would have negligible impacts to vegetation. These impacts would be somewhat offset by the reduced use of motor vehicles in close proximity to the canyon rim at the visitor center, which could reduce the existing level of vehicle noise currently projected into Walnut Canyon.

ENVIRONMENTAL CONSEQUENCES

Approximately 1 1/4 miles of existing primitive road would be improved through the adjacent Coconino National Forest, and another 2 miles would be constructed along the northeastern canyon rim. An undetermined area of vegetation would be removed and wildlife habitat would be lost along the route. Soils and intermittent drainage patterns would also be locally disrupted. The proposed route would bisect a known elk and pronghorn movement corridor. Motor vehicle noise would be projected directly into the eastern end of canyon, increasing disturbance to wildlife. Vehicle use along the new road would increase wildlife mortality from vehicle collisions. Much of the potential impact to wildlife would be mitigated by the nighttime closure of the monument. The road would also provide a new dispersal corridor for nonnative plant species. For these reasons, the proposed scenic road would have long-term, minor adverse impacts to most aspects of natural systems, including soils, intermittent drainage systems, and vegetation. Depending upon the frequency and timing of traffic, the road would have long-term, minor adverse impacts to more abundant wildlife species, and long-term, moderate adverse impacts to solitary species that currently use remote areas of Walnut Canyon.

Under Alternative 1, a variety of nonmotorized, visitor use areas would be formalized within the proposed Extended Learning, Guided Adventure, and Natural Area Recreation Zones. A local trail system would be established along abandoned roads within the north-central canyon rim area, and ranger-guided hikes would be routinely conducted along the north canyon rim and east canyon floor areas.

Increased visitor activity within these management zones would potentially result in unplanned trail segments to popular archaeological features and/or scenic viewpoints, and localized soil compaction, vegetation trampling, erosion, spread of nonnative plants, and noise disturbance to wildlife. Visitor use within the proposed Extended Learning Zone would have long-term, minor adverse impacts upon natural systems and processes.

The proposed Natural Area Recreation Zone encompasses the northwest canyon rim area included in the 1996 boundary expansion. Popular recreational activities that occurred under former U.S. Forest Service management of this area, including hiking, bicycling, and horseback riding, would be allowed to continue. Many potential adverse impacts from recreational activities to soils, local drainage patterns, vegetation, and wildlife are already occurring. Although nonmotorized recreational use would be expected to increase within the zone, this use would likely have negligible to long-term, minor adverse impacts to natural systems within the northwest canyon rim area.

Guided hiking activity within the east canyon area would provide frequent visitor access to the canyon floor. Although dispersed hiking is proposed initially, instead of fixed trail routes, access to the canyon floor would require "scrambling" down and up the steep canyon slopes. The rugged terrain would necessitate the repeated use of a few ledge routes and/or tributary drainages to reach the canyon bottom. Eventually, trails would need to be formalized to minimize damage from erosion and social trailing. The east canyon area is a known movement corridor and

seasonal foraging area for elk and pronghorn, and is inhabited by other solitary wildlife species. Depending on the timing and frequency of tours, group size, and access routes, visitor use in the Guided Adventure Zone would cause long-term, minor adverse impacts to soils, tributary canyon drainages, vegetation, and more abundant wildlife species. Visitor use within the east canyon area would have long-term, moderate adverse impacts to solitary wildlife species unless the area is closed during important breeding and/or migration seasons, and tour frequency and group size are limited.

The remaining area within the monument area would be formally recognized as a Resource Preservation Zone, and unauthorized entry would be prohibited. This would have long-term, moderate beneficial impacts to natural systems and processes.

CUMULATIVE EFFECTS

Under Alternative 1, the total area within the monument impacted by NPS facilities and visitor use would increase from the current 180 acres (5% of the total area) to an estimated 700 acres (20% of the total area). The existing road system would almost double in length and visitor access in one form or another would be formalized along the entire north canyon rim and the east canyon floor. The combined effect of the new road, trails, and dispersed hiking areas would magnify adverse impacts such as unplanned trail segments, soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. More significantly, the new road and visitor uses would result in sustained daytime human presence and vehicle noise along much of the north side of Walnut Canyon. The

resulting noise would increase the level of disturbance to solitary wildlife species within the narrow canyon. Some of the cumulative impact to wildlife would be mitigated by the nighttime closure of the monument. The new road and visitor use areas would also provide for dispersal of nonnative plant species virtually anywhere within the north rim area. For these reasons, Alternative 1 would have long-term, moderate adverse cumulative impacts to natural systems and processes within the monument.

The cumulative impacts of NPS management of Walnut Canyon on the surrounding region and of adjacent land use impacts on natural systems within the monument would be the same as those described for the No-Action Alternative.

CONCLUSION

Under Alternative 1, natural systems within Walnut Canyon National Monument would continue to recover from historic land use impacts. NPS operations and visitor activities around the existing north-central canyon area, and fencing the 1996 boundary area would have similar impacts to those identified for the No-Action Alternative. The combined impact of the new road system, trail corridors, and dispersed hiking across the entire north canyon rim would magnify adverse impacts such as unplanned trail segments, soil compaction, vegetation trampling, localized erosion, spread of nonnative plants, and noise and disturbance to wildlife. Sustained daytime human presence and traffic noise along most of the north canyon rim would have long-term, moderate adverse impacts to solitary wildlife species within the narrow canyon. Some of the impact to wildlife would be mitigated by the nighttime closure of the monument.

The new road and visitor use areas would also provide for dispersal of nonnative plant species virtually anywhere within the north rim area. Alternative 1 would result in long-term, moderate adverse cumulative impacts to natural systems and processes within the monument.

The area impacted by NPS facilities and frequent visitor use would increase from 5% to an estimated 20% of the total area within the monument. Alternative 1 would result in no major impacts on natural systems and processes in Walnut Canyon National Monument.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Under Alternative 2, natural systems and processes within Walnut Canyon National Monument would be allowed to continue recovering from the adverse impacts of historic logging, fire suppression, and livestock grazing. The impacts of existing NPS operations and visitor activities around the north-central canyon area would be similar to the No-Action Alternative. The impacts of fencing the 1996 boundary area, and

closing that area to existing recreational activities would be similar to what is described for the No-Action Alternative. Ongoing efforts to improve visitor orientation about appropriate behavior toward sensitive resources could mitigate some adverse visitor use impacts to natural systems and processes.

The impacts from continued daytime use of the existing entrance road would be the same as the No-Action Alternative. However, under Alternative 2 the entire entrance road from I-40 to the existing visitor center would be gated at night. This would likely reduce occasional nighttime traffic along the road and associated noise disturbance and wildlife mortality, resulting in long-term, minor beneficial impacts to wildlife within the monument.

A new visitor center and parking area would be built near I-40 at the park entrance, which would require the removal of several acres of vegetation and associated loss of wildlife habitat, soils disturbance, and local disruption of drainage patterns. The surrounding area within 300 feet of the facility would likely be impacted by heavy visitor use, resulting in the establishment of unplanned trail segments, localized soil compaction, erosion, vegetation trampling, noise disturbance to wildlife, and spread of nonnative plants. The NPS would be required to manage native vegetation surrounding the larger developed area, including actions such as removing individual hazard trees. The development of new facilities at I-40 would allow the NPS to manage visitor crowding, traffic congestion, and resource degradation along the north-central canyon rim area in the future if natural resource impact thresholds become unacceptable. The

ability to reduce long-term adverse impacts to natural systems along the canyon rim would offset the impacts of constructing the facilities.

A portion of the existing visitor center would be removed, and the disturbed area would be restored to natural vegetation and wildlife habitat. There would be short-term, minor adverse impacts to vegetation and soils around the visitor center during the remodeling and vegetation restoration effort.

Under Alternative 2, visitor access and activity would increase within the proposed Extended Learning Zone along the north-central canyon rim. Ranger-guided hikes would be routinely conducted, and a local self-guided trail system would be established along abandoned roads within this management zone. Increased visitor activity within these management zones would potentially result in unplanned trail segments to popular archaeological features and/or scenic viewpoints, and localized soil compaction, vegetation trampling, erosion, spread of nonnative plants, and noise disturbance to wildlife. Visitor use within the proposed Extended Learning Zone would have long-term, minor adverse impacts on natural systems and processes.

Approximately 1 1/4 miles of existing primitive road would be improved through the adjacent Coconino National Forest, and a staging area would be established along the northeast canyon rim for access into the Guided Adventure Zone. Improving and maintaining the road would disturb soils, local drainage, vegetation, and wildlife habitat along the existing route. Increased vehicle use would cause a greater disturbance to local elk and pronghorn

populations. Motor noise would be projected directly into the canyon at the staging area, increasing disturbance to solitary wildlife species. Much of the potential impact to wildlife would be mitigated by the nighttime closure of the monument. For these reasons, the proposed road improvements and staging area would have long-term, minor adverse impacts to most aspects of natural systems, including soils, intermittent drainage systems, and vegetation. Depending on the frequency and timing of traffic, the road would have long-term, minor adverse impacts to more abundant wildlife species, and long-term, moderate adverse impacts to solitary species that currently use remote areas of Walnut Canyon.

Guided hiking activity within the proposed Guided Adventure Zone in the east canyon area would expand visitor use into the canyon floor. Although dispersed hiking is proposed at first instead of fixed trail routes, access to the canyon floor would require "scrambling" down and up the steep canyon slopes. The rugged terrain would necessitate the repeated use of a few ledge routes and/or tributary drainages to reach the canyon bottom. The east canyon area is a known movement corridor and seasonal foraging area for elk and pronghorn, and is inhabited by other solitary wildlife species. Depending upon the timing and frequency of tours, group size, and access routes, visitor use in the Guided Adventure Zone would cause long-term, minor adverse impacts to soils, tributary canyon drainages, vegetation and more abundant wildlife species. Visitor use within the east canyon area would have long-term, moderate adverse impacts to solitary wildlife species unless the area is closed during important breeding

and/or migration seasons, and tour frequency and group size are limited.

The remaining area within the monument (approximately 93%) would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. This would have long-term, moderate beneficial impacts to natural systems and processes.

CUMULATIVE EFFECTS

Under Alternative 2, the total area within the monument impacted by NPS facilities and visitor use would increase from the current 180 acres (5% of the total area) to an estimated 230 acres (7% of the total area). Establishing visitor access into the east canyon area within the proposed Guided Adventure Zone would result in long-term, minor adverse cumulative impacts to the Walnut Canyon ecosystem. The cumulative effects of NPS management on regional natural systems and adjacent land use impacts on natural systems within the monument would be the same as identified for the No-Action Alternative.

CONCLUSION

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

Under the various management alternatives, the total area of natural systems and processes directly impacted by visitor access and NPS support facilities would range from 180 to 700 acres of the total 3,000 acres within Walnut Canyon National Monument. Under Alternatives 1 and 2, localized areas of soils, vegetation, and wildlife habitat would be impacted to develop new visitor access or NPS support facilities. However, these areas could potentially be restored to near natural conditions should the facilities be removed at some future time. Accommodating increased visitation levels would increase the amount of human disturbance to wildlife populations and could permanently disrupt certain species population numbers within the monument.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

Various long-term local disturbances to natural systems and processes would be incurred under the alternatives in order to expand visitor use infrastructure, visitor support facilities, and/or NPS administrative facilities. Under Alternative 1, the integrity of the Walnut Canyon ecosystem and key wildlife habitat would be degraded in order to provide visitors a scenic driving experience.

Unavoidable Adverse Impacts



Historical land use and occasional visitor use have occurred within the backcountry area of Walnut Canyon National Monument for more than a century and have had unknown

impacts to natural systems and processes. Under all the alternatives, the entrance road would interfere to varying degrees with the local movement or migration of many animal species. Construction of new buildings parking areas, roads, and trails under Alternatives 1 and 2 would locally disturb soils, drainage patterns, vegetation, wildlife habitat, and potentially increase the area dominated by nonnative, invasive plant species. Visitor use around the proposed interpretive, education, and discovery zones would likely result in local unplanned trail segments between popular features and increased soil compaction, vegetation trampling, disruption of intermittent drainage systems and erosion, spread of nonnative plants, and noise and disturbance to wildlife. Alternative 1 proposes significantly expanded road and visitor access across most of the north canyon rim area, which would have unavoidable adverse impacts to solitary wildlife species that currently find natural quiet and remote habitat within Walnut Canyon. Alternative 2 would also expand visitor access to the east canyon floor, but the NPS would also be able to mitigate impacts to solitary wildlife species through seasonal restrictions.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Methodology

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon federally listed threatened, endangered, and other sensitive species. The Arizona Heritage Data Management System (Arizona Game and Fish Department 2001) was consulted via the Internet to generate a list of threatened and endangered species, and "species of concern" for Coconino County, Arizona. This list was compared to the draft National Park Species database for Walnut Canyon National Monument, which was recently compiled as part of the NPS Natural Resource Inventory and Monitoring Program and is the most current documentation of the monument's flora and fauna. In addition, the results of a recent survey for special status plants at the monument were considered (Huisinga et al. 2000). The recent designation of critical habitat for the threatened Mexican spotted owl within the monument requires careful consideration of potential adverse impacts upon this area. The locations of proposed visitor access, activities, and support facilities for the various alternatives were compared to known sensitive species distribution records and habitat types in order to assess potential impacts. The actual status and distribution for several of the identified species is not well known, and predictions about impacts were largely based on available research describing a given species biology, ecology, and recent monitoring data from the region

surrounding Walnut Canyon. The results of past studies of visitor and land use impacts to regional ecosystems were also used where similar impacts would be anticipated. The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: An action that would not affect any individuals of a sensitive species or their habitat within Walnut Canyon National Monument.

Minor: An action that would affect a few individuals of sensitive species or have very localized impacts upon their habitat within Walnut Canyon National Monument. The change would require considerable scientific effort to measure and have barely perceptible consequences to the species or habitat function.

Moderate: An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a sensitive species population, (2) the existing dynamics between multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), or (3) a relatively large habitat area or important habitat attributes within Walnut Canyon National Monument. A sensitive species population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely viable within the monument.

Major: An action that would have drastic and permanent consequences for a sensitive species population, dynamics between multiple species, or almost all available critical or unique habitat area within Walnut Canyon National Monument. A sensitive species population or its habitat would be permanently altered from

normal levels under existing conditions, and the species would be at risk of extirpation from the monument.

Effects Of No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Currently, no federally listed threatened or endangered plant species are known to occur in Walnut Canyon National Monument. *Rumex orthonuerus*, a threatened plant species, could potentially occur in wetland habitat within the monument. However, it has not been discovered during numerous botanical inventories and likely does not occur because of the relative scarcity of deep soil terraces adjacent to perennial waters. Another three "species of concern" are documented or potentially occur in habitats at the bottom the canyon, including riparian habitats. *Aquilegia desertorum* occurs within the monument along the Walnut Canyon floor and southern tributary drainages. *Erigeron saxatalis* also occurs within the monument along the drainage at the bottom of Walnut Canyon. *Cimicifuga arizonica* potentially occurs within heavily shaded areas in Walnut Canyon, including riparian habitat, but has not been discovered during numerous botanical inventories of the monument.

Two additional plant species of concern could potentially occur in upland habitats within the monument. *Clematis hirutissima* var. *arizonica* is documented within the Walnut Canyon watershed upstream from the monument. This subspecies prefers gentle, north-northeast trending slopes with well-developed

limestone soils. *Clematis hirutissima* var. *arizonica* has yet to be discovered during botanical surveys of the monument, but likely occurs because of the presence of good habitat. *Hedeoma diffusum* grows along limestone bluffs in Walnut Canyon upstream from the monument. This species has yet to be discovered during botanical surveys, but likely occurs because of the presence of good habitat.

One threatened animal species and a number of animal "species of concern" occur within the monument. The Mexican spotted owl, listed as threatened by the U.S. Fish and Wildlife Service, nests within the monument in densely forested, steeply sloping canyon terrain. The U.S. Fish and Wildlife Service recently designated critical habitat for the species within the monument. The designated habitat is entirely within the backcountry closure area, and existing NPS operations and visitor activities have negligible impacts. The NPS would continue to consult with the U.S. Fish and Wildlife Service in order to ensure management actions do not adversely impact the Mexican spotted owl. The NPS would continue to monitor the owl, protect known nesting territories, and preserve specific habitat attributes in accordance with the Mexican Spotted Owl Recovery Plan (U.S. Fish and Wildlife Service 1995).

Two additional sensitive raptor species are known to occur within the monument. The peregrine falcon nests on the massive cliff faces of Walnut Canyon. Although the species was recently removed from the endangered species list by the U.S. Fish and Wildlife Service, the NPS would continue to monitor breeding activity. Northern goshawk, a species

of concern, also nests within densely forested, steeply sloping canyon terrain within the monument. The NPS would attempt to monitor this species. Most of the preferred habitat for these species is within the backcountry closure area, and existing NPS operations and visitor activities likely have negligible impacts.

Twelve species of bats that occur within Coconino County are considered species of concern. The fractured cliff faces of Walnut Canyon provide ample bat habitat, and sensitive species such as Townsend's big-eared bat potentially occur within the monument. The NPS currently has little information on the bat fauna, and would attempt to inventory the species occurring within the monument.

Walnut Canyon provides ideal den sites for mountain lions. Although not formally designated as a sensitive species, concern was identified during the scoping process because mountain lions are large predators with expansive home ranges that transcend the monument boundary. The agency would attempt to develop information on the distribution and abundance of mountain lions, and follow established agency policy to sustain the ecological role of natural predators while minimizing threats to public safety.

Threatened and sensitive species within the monument have likely been impacted by historic logging, timber management, fire suppression, livestock grazing, and water impoundments within Walnut Canyon. Under the No-Action Alternative, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. The NPS would continue to periodically assess the

distribution and status of sensitive species, to restore the ecological role of fire within ponderosa forest along the level canyon rim terraces, and to attempt to control nonnative plant infestations when feasible.

Current NPS operations and visitor activities would remain concentrated in a relatively small area of upland habitats in proximity to the north-central canyon rim. No plant species of concern are known to occur within existing developed or visitor use areas, but *Hedeoma diffusum* occurs in nearby canyon rim habitat, and current visitor use could cause minor trampling impacts to individual plants. No new visitor access or NPS facilities are currently proposed within the preferred habitats of sensitive wildlife species.

Approximately 1,300 additional acres added in the 1996 boundary expansion would be closed to current recreational activities. Until the new boundary is surveyed, fenced, and posted, some recreational disturbance to sensitive wildlife species would likely cause short-term, minor adverse impacts.

Mexican spotted owls, peregrine falcons, northern goshawks, and mountain lions continue to be observed within the monument, and have tolerated existing visitor activities, NPS operations, and associated ambient noise thresholds generated within the north-central canyon area for decades. Although little is known about the bat fauna in the canyon, these species are predominantly nocturnal, and impacts from existing daytime visitor use around the archaeological interpretive areas are likely negligible.

Under the No-Action Alternative, approximately 95% of the area within the monument would remain closed to general public access to protect sensitive cultural and natural resources. This effectively precludes most disturbance to riparian habitat within the canyon bottom, densely forested, steeply sloping canyon terrain, and cliff faces. Occasional dispersed hiking would continue within the closed area during cultural site preservation projects, guided hikes, resource monitoring studies, scientific research, educational activities, other special uses, and unauthorized hiking. Site-specific surveys would be required prior to any ground/vegetation disturbance, change in access corridors, or change in ambient noise levels to ensure sensitive species are not impacted. Sensitive plant and animal species would be effectively protected from disturbance, and unique habitat attributes would be preserved within Walnut Canyon National Monument. For the reasons discussed above, the No-Action Alternative would likely have no adverse impacts on threatened, endangered, or sensitive species.

CUMULATIVE EFFECTS

The cumulative impacts of continuing public visitation to and NPS administration of Walnut Canyon National Monument on threatened, endangered, and sensitive species are difficult to estimate. Many of these species are experiencing long-term declines as a result of regional development and land uses over which the NPS has very little control. Others are sensitive because they have very localized habitats or very specific habitat attributes which could be heavily impacted by relatively minor management actions. At Walnut

Canyon, the NPS cooperates when a regional species management framework is needed to sustain a widespread species. The narrowly distributed species are well protected within Walnut Canyon by the backcountry closure. Adverse cumulative impacts would likely only result from increased visitation and road traffic, especially for sensitive wildlife species.

The greatest cumulative impacts to sensitive species within Walnut Canyon are undoubtedly attributed to the impoundment of Walnut Creek upstream from the monument at Upper and Lower Lake Mary. The lakes have prevented seasonal stream flows through Walnut Canyon since 1941. As a result, *Cimicifugia arizonica* and *Erigeron saxatilis* may be experiencing long-term decline along with other riparian-dependent species in the canyon drainage system. The impoundments have also changed the seasonal reliability of surface water for wildlife species, and may have caused subtle changes in the riparian prey base and predator-prey interactions. However, sensitive wildlife species persist and are believed to have adapted to these changes. Long-term monitoring data would be required to reliably assess these impacts.

As Flagstaff continues to grow, residential development is anticipated to encroach upon the northwestern monument boundary. Along with this growth, recreational activity is expected to increase in proximity to the monument, along with the potential for increased unauthorized access into sensitive species habitat, introduction and spread of invasive plants, increased predation by feral cats and dogs, degradation of water quality in riparian areas, and

increased human-mountain lion interactions. These actions could all have adverse cumulative impacts upon threatened, endangered, and sensitive species within the monument.

CONCLUSION

There are six threatened/sensitive plant species and six threatened/sensitive animal species that are either known or could potentially occur within the monument. Vegetation and wildlife habitat would continue to recover from historic land uses. Monitoring programs are needed to routinely assess the distribution and status of sensitive species, and to ensure they are not impacted by visitor use and NPS operations.

Approximately 95% of the area within the monument remains closed to general public access. The backcountry closure effectively protects most sensitive plant and animal species habitat, including all designated critical habitat for the Mexican spotted owl. Current NPS operations and visitor activities would remain concentrated in a relatively small area around the north-central canyon rim. No plant species of concern are known to occur within existing developed or visitor use areas, but *Hedeoma diffusum* occurs in nearby canyon rim habitat and experiences the greatest risk of impacts from current visitor use. Sensitive wildlife species appear to have adapted well to existing NPS operations, visitor uses, ambient noise levels, and historic changes within the Walnut Canyon watershed caused by upstream impoundments. Sensitive plant species that are restricted to riparian habitats, including *Cimicifugia arizonica* and *Erigeron saxatilis*, may be experiencing long-

term declines as a result of the creation of Upper and Lower Lake Mary, but long-term monitoring data would be needed to reliably assess trends. Other cumulative effects could result from exceeding visitor carrying capacity within the monument, and from nearby development within the town of Flagstaff.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Under Alternative 1, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Existing facilities, NPS operations, and visitor activities in proximity to the north-central canyon area would have negligible impacts to threatened, endangered, or sensitive species. The proposed shortening of the existing access road, new parking area, and new orientation facility near I-40 would not occur near known sensitive species locations or preferred habitats, and would likely have negligible impacts to threatened, endangered, or sensitive species. The NPS would continue to consult with the U.S. Fish and Wildlife Service in

order to ensure management actions do not adversely impact the Mexican spotted owl. The NPS would continue to monitor the owl, protect known nesting territories, and preserve specific habitat attributes in accordance with the Mexican Spotted Owl Recovery Plan (U.S. Fish and Wildlife Service 1995).

The proposed north rim scenic drive (involving improvement of an existing primitive road through the adjacent Coconino National Forest and development of two miles of road along the northeastern canyon rim) could potentially impact undiscovered populations of *Hedeoma diffusum* or *Clematis hirtissima* var. *arizonica*. Site-specific surveys would be required prior to any ground/vegetation disturbance to ensure sensitive plant species are avoided. Most of the proposed road would be routed far enough from Mexican spotted owl critical habitat to minimize ambient traffic noise. However, monitoring would be required to reliably ensure this action has no adverse impact to the Mexican spotted owl. Similar impacts would be expected for the northern goshawk and mountain lion, which also inhabit the east canyon area. Continued nighttime closure of the monument mitigates many impacts from the proposed road. Other potential mitigating measures include strategically routing the road farther from the canyon rim, transporting visitors via quiet shuttle buses, and/or temporary closure of the area during sensitive species breeding seasons.

Under Alternative 1, a variety of nonmotorized, visitor use areas would be formalized within the proposed Extended Learning, Guided Adventure, and Natural Area Recreation Zones. Increased visitor

activity along the proposed trails and ranger-guided hikes along the north canyon rim area could potentially impact *Hedeoma diffusum* or *Clematis hirutissima* var. *arizonica*. The area would be fully surveyed and any discovered populations would be avoided. Within the 1996 western boundary expansion area, hiking, bicycling, and horse riding activities would continue above the northwest canyon rim at levels similar to prior U.S. Forest Service management of these lands. Sensitive plant populations, including *Hedeoma diffusum* or *Clematis hirutissima* var. *arizonica*, might suffer minor adverse impacts from occasional trampling. Sensitive wildlife species, including Mexican spotted owl, have likely adapted to existing levels of human activity and noise within the area, and this action would have negligible impacts to them.

Guided hiking activity would be established within a limited area of the canyon floor near the eastern monument boundary. Although dispersed hiking is proposed at first instead of fixed trail routes, access to the canyon floor would require "scrambling" down and up the steep canyon slopes. Sensitive plants occurring in both canyon rim habitats (*Hedeoma diffusum* or *Clematis hirutissima* var. *arizonica*) and riparian habitats on the canyon floor (*Aquilegia desertorum*, *Erigeron saxatilis*, or *Cimicifuga arizonica*) could receive minor adverse impacts from occasional trampling. The proposed guided hiking area is more than 1 1/2 miles away from designated critical habitat for the Mexican spotted owl, and no adverse impacts are anticipated. The east canyon area is also a known habitat area for the northern goshawk and mountain lion. Increasing visitor activity would

potentially disturb either species, and/or increase human-mountain lion interactions. Unfavorable mountain lion behavior would result in relocation or killing of the animal, which would have a minor adverse impact upon the regional mountain lion population. Potential adverse impacts to sensitive wildlife species would be mitigated by continued closure of the monument at night, monitoring for potential visitor use disturbance impacts, and/or establishing seasonal closures during breeding seasons.

The remaining area within the monument area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. This effectively precludes most disturbance to designated critical habitat for the Mexican spotted owl, riparian habitat within the canyon bottom, densely forested canyon terrain, and remote cliff faces. Occasional dispersed hiking would continue within the closed area during cultural site preservation projects, resource monitoring studies, scientific research, educational activities, other special uses, and unauthorized hiking.

Under Alternative 1, sensitive plant and animal species would be effectively protected from disturbance, and unique habitat attributes would be preserved within Walnut Canyon National Monument. For the reasons discussed above, this alternative would likely have no adverse impacts on threatened, endangered, or sensitive species.

CUMULATIVE EFFECTS

Under Alternative 1, the total area within the monument impacted by NPS facilities and visitor use would increase from the current 180 acres

(5% of the total area) to an estimated 700 acres (20% of the total area). The existing road system would almost double in length, and visitor access in one form or another would be formalized along the entire north canyon rim and the east canyon floor. Extensive survey of the north rim and east canyon floor area for sensitive plant species would be required to avoid potential adverse impacts. The cumulative effect of the new road, trails, and dispersed hiking areas would result in sustained daytime human presence and vehicle use along most of the north side of Walnut Canyon. A resulting increase in ambient noise is anticipated, which would increase disturbance to sensitive wildlife species within the narrow canyon. Some of the cumulative impact to sensitive wildlife would be mitigated by the continued nighttime closure of the monument.

Other cumulative effects resulting from NPS management of Walnut Canyon on the surrounding region and from adjacent land uses on natural systems within the monument would be the same as those identified for the No-Action Alternative.

CONCLUSION

Under Alternative 1, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Proposed new facilities in proximity existing facilities in the north-central canyon area would likely have no adverse impacts to threatened, endangered, or sensitive species. The cumulative effect of proposed new road, trails, and dispersed hiking areas would result in sustained daytime human presence and increased ambient noise along most of the north canyon rim, which would cause a disturbance to sensitive

wildlife species within the adjacent narrow canyon. Approximately 80% of the area within the monument area would be formally recognized as a Resource Preservation Zone, and unauthorized access would be prohibited. This would effectively preclude most disturbance to Mexican spotted owl critical habitat, riparian habitat within the canyon bottom, densely forested canyon terrain, and remote cliff faces.

Under Alternative 1, sensitive species would be surveyed and monitored more intensively, and mitigating measures would be adopted to effectively protect them and their habitats within Walnut Canyon National Monument.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Under Alternative 2, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Continued use of the entrance road, existing NPS facilities, and visitor activities in proximity to the north-central canyon area would have no adverse impacts to

threatened, endangered, or sensitive species. The proposed new visitor center and parking area near I-40 are not in proximity to known sensitive species locations or preferred habitats, and would likely have no adverse impacts to threatened, endangered, or sensitive species. The proposed closure of the 1996 boundary expansion area to existing recreational activities would likely have beneficial effects on sensitive wildlife species known to inhabit the western canyon area within the monument. The NPS would continue to consult with the U.S. Fish and Wildlife Service in order to ensure management actions do not adversely impact the Mexican spotted owl. The NPS would continue to monitor the owl, protect known nesting territories, and preserve specific habitat attributes in accordance with the Mexican Spotted Owl Recovery Plan (U.S. Fish and Wildlife Service 1995).

Under Alternative 2, visitor activity would increase with new trails and ranger-guided hikes in the proposed Extended Learning Zone, which could potentially impact *Hedeoma diffusum* or *Clematis hirutissima* var. *arizonica* in the north-central canyon rim area. The area would be fully surveyed and any discovered populations would be avoided. Existing ambient noise levels within the north-central canyon rim area would not be expected to noticeably increase, and increased visitor use would have negligible impacts to sensitive wildlife species, including Mexican spotted owl.

Approximately 11¼ miles of existing primitive road would be improved through the north-central canyon rim area, and terminate at a staging area for guided hikes. The road would approach the northeastern canyon

rim near designated critical habitat for the Mexican spotted owl. However, general vehicle access would be prohibited, and ambient noise would not be expected to noticeably increase within the canyon. Much of the potential impact to sensitive wildlife species would be mitigated by the continued nighttime closure of the monument, restricted use of the road, and establishing seasonal closures during important periods of sensitive species activity. For these reasons, development of the new road would likely have negligible impacts to the Mexican spotted owl and other sensitive wildlife species.

Guided hiking activity would increase human presence and noise disturbance within the east canyon floor. Dispersed hiking is proposed at first, instead of fixed trail routes, and access would require "scrambling" down and up the steep canyon slopes. Sensitive plants occurring in both canyon rim habitats (*Hedeoma diffusum* or *Clematis hirutissima* var. *arizonica*) and riparian habitats on the canyon floor (*Aquilegia desertorum*, *Erigeron saxatilis*, and *Cimicifuga arizonica*) could be occasionally trampled. The area would be fully surveyed and any discovered populations would be avoided. The proposed guided hiking area is outside of the designated critical habitat area for the Mexican spotted owl, and no adverse impact to the species is anticipated. The east canyon area is also a known habitat area for the northern goshawk and mountain lion. Increasing visitor activity would potentially disturb either species, and/or increase human-mountain lion interactions. Unfavorable mountain lion behavior would result in relocation or killing of the animal. Potential adverse impacts to sensitive wildlife species would be mitigated by

continued closure of the monument at night, restricting visitor entry unless accompanied by NPS staff, monitoring for potential visitor-use disturbance impacts, and establishing seasonal closures during breeding seasons.

Approximately 93% of the total area within the monument would be designated a Resource Preservation Zone, and unauthorized entry would be prohibited. This effectively precludes most disturbance to critical habitat for the Mexican spotted owl: riparian habitat within the canyon bottom, densely forested canyon terrain, and remote cliff faces. Occasional dispersed hiking would continue within the closed area during cultural site preservation projects, resource monitoring studies, scientific research, educational activities, other special uses, and unauthorized hiking.

Under Alternative 2, threatened, endangered, and sensitive species would be effectively protected from disturbance, and unique habitat attributes would be preserved within Walnut Canyon National Monument. For the reasons discussed above, this alternative would likely have no adverse impacts on threatened, endangered, or sensitive species.

CUMULATIVE EFFECTS

The cumulative effects for Alternative 2 would be similar to those identified for the No-Action Alternative.

CONCLUSION

Under Alternative 2, habitat for sensitive plant and wildlife species would continue recovering from former land uses within the monument. Continued NPS operations and visitor activities in the north-central canyon area would have negligible impacts to threatened,

endangered, or sensitive species. The proposed new visitor center and parking area near I-40 are not in proximity to known sensitive species locations or preferred habitats, and would likely have negligible impacts to threatened, endangered, or sensitive species. Closure of the 1996 western boundary area to existing recreational activities would likely have beneficial impacts to sensitive wildlife species known to inhabit the western canyon area. Sensitive plant species within the proposed Extended Learning Zone, northeast canyon rim access road, and the Guided Adventure Zone in the east canyon area would be surveyed and avoided. Potential adverse impacts to sensitive wildlife species within the proposed Guided Adventure Zone in the eastern canyon area would be mitigated by continued closure of the monument at night, restricting visitor entry unless accompanied by NPS staff, monitoring for potential visitor use disturbance impacts, and establishing seasonal closures during breeding seasons.

Approximately 93% of the area within the monument would be formally recognized as a Resource Preservation Zone, and unauthorized entry would be prohibited. This effectively would preclude most disturbance to critical habitat for the Mexican spotted owl: riparian habitat within the canyon bottom, densely forested canyon terrain, and remote cliff faces.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the

park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of threatened, endangered, or species, or their habitats.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

Under Alternatives 1 and 2, road improvements along the northeast canyon rim would provide more convenient access to the east canyon area. This would increase ambient traffic noise levels and potential disturbance of sensitive wildlife species within the narrow canyon.

Unavoidable Adverse Impacts

Historical land use and occasional visitor use have occurred within the backcountry area for many years, and had unknown impacts to sensitive species and their respective habitats. Under all of the alternatives, continuing visitor activity and NPS operations within the north-central canyon area would disturb sensitive animal species. The trend of increasing visitor numbers and associated vehicle traffic to the north-central canyon rim could also eventually have adverse impacts to sensitive wildlife species.

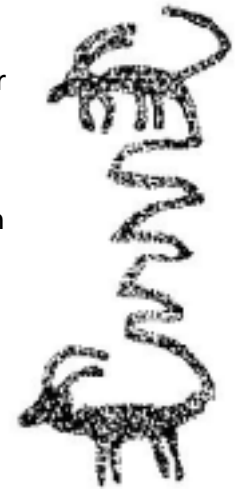
Under Alternatives 1 and 2, proposed road improvements, new trails, and

new facilities would potentially increase the risk of establishment and dispersal of nonnative, invasive plant species. Expanding visitor access corridors and use areas along the north canyon rim and into the east canyon floor could increase human presence and noise disturbance to sensitive wildlife species within the narrow canyon. Under Alternative 1, increased visitor use within the proposed Natural Area Recreation Zone could result in increased trampling of sensitive plant species and increased noise disturbance to sensitive wildlife species.

LONG-TERM INTEGRITY OF WETLANDS, FLOODPLAINS, AND RIPARIAN HABITAT

Methodology

Available information on riparian resources for Walnut Canyon National Monument was reviewed. This included information on the riparian corridor along the floor of Walnut Canyon, and perennial seeps on the canyon floor and in tributary side canyons, primarily from the investigations of Brian (1985) and Phillips (1990). Very little information is available on the hydrology and water quality for the reach of Walnut Creek, intermittent drainages, or seeps within the monument. The potential impacts of each alternative on wetlands, floodplains, and riparian areas were evaluated by comparing their locations to proposed visitor and support facilities, and to the anticipated visitor uses and



administrative activities within the various management zones. Predictions about short- and long-term impacts were based on past studies of land use and visitor impacts to similar watersheds within the regional ecosystem. The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: An action that would cause no change in an existing wetland area or function, the ability of a floodplain to convey floodwaters, or to riparian vegetation and wildlife communities.

Minor: An action that would cause no change in wetland or floodplain area and function. The action would affect a few individuals of plant or wildlife species within an existing wetland or riparian area within the monument. The change would require considerable scientific effort to measure and have barely perceptible consequences to wetland or riparian habitat function.

Moderate: An action that would change an existing wetland area or floodplain function, but the impact could be mitigated by the creation of artificial wetlands or modification of proposed facilities in floodplains. The action would have a measurable effect on plant or wildlife species within an existing wetland or riparian area, but all species would remain indefinitely viable within the monument.

Major: An action that would have drastic and permanent consequences for an existing wetland area or floodplain function which could not be mitigated. Wetland and riparian species dynamics would be upset, and species would be at risk of extirpation from the monument.

Effects of No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Wetland, floodplain, and riparian resources within Walnut Canyon National Monument are restricted to the narrow canyon bottom and localized perennial seeps found in the tributary canyons on the south side of the monument. There are no existing NPS facilities or visitor uses within wetlands, floodplains, or riparian areas, and these resources are entirely within the backcountry closure area of the monument. The existing entrance road and most facilities drain away from the canyon rim, and are not affecting storm runoff stages or contributing pollutants to the Walnut Canyon watershed. Occasional hiking would continue within the riparian corridor on the canyon floor for cultural site stabilization projects, monitoring studies, scientific research, educational activities, and other special uses. In addition, occasional unauthorized hiking would likely continue along the canyon bottom. Under the No-Action Alternative, continued NPS operations and visitor uses would have negligible impacts to wetland, floodplain, and riparian resources within the monument.

The 1996 boundary expansion included an additional 4-mile upstream reach and 4-mile downstream reach of the meandering Walnut "Creek" drainage within the monument. Under the No-Action Alternative, both the upper and lower reaches of the canyon floor, including the wetland, floodplain, and riparian resources they encompass, would be surveyed, fenced, and closed to general visitor access. The upper 4 miles of riparian resources within the

monument receive occasional hiking impacts, and the downstream 4 miles are being impacted from livestock grazing under U.S. Forest Service grazing leases. Excluding recreational impacts would likely have negligible impacts to wetlands, floodplains, and riparian resources within the monument. Excluding livestock grazing from the canyon floor would likely have long-term, minor to moderate beneficial impacts to wetlands, floodplains, and riparian resources within the monument.

The Santa Fe Dam, a small impoundment near the downstream end of the canyon, would continue to exist on privately owned land within the monument. The dam is more than 100 years old and is a significant historical site. The NPS is seeking to acquire this land and would become owner of the dam and reservoir. Under the No-Action Alternative, the NPS would probably not remove the dam unless it is determined to be a public safety threat or to be causing serious resource impacts. Although the reservoir has locally impacted wetlands, floodplains, and riparian resources since it was constructed, it is almost entirely filled with sediment, and most local storm flows pass through the dam's spillway. The local reach of the historically impacted stream channel and sediment plain behind the dam would continue to be dominated by both native and nonnative weedy annual species, such as Russian thistle (*Salsola iberica*), cheatgrass (*Bromus tectorum*), horehound (*Marrubium vulgare*), sweet clover (*Melilotus albus*), and field bindweed (*Convolvulus arvensis*). The canyon floor area around the reservoir would continue to be seasonally used by wildlife for browse. A shallow area of water would continue to accumulate during

periods of storm runoff, which would also continue to be used by wildlife. Under the No-Action Alternative, the continued existence of the historic reservoir would have negligible impacts to wetland, floodplain, and riparian resources within Walnut Canyon National Monument.

CUMULATIVE EFFECTS

The geographic area used in the consideration of cumulative impacts is the Walnut Canyon watershed.

Under the No-Action Alternative, the historic Santa Fe dam would likely have negligible cumulative impacts to wetland, floodplain, and riparian resources within the Walnut Canyon watershed. The reservoir area behind the dam is mostly filled with sediment, and storm flows pass through the dam's spillway to maintain downstream riparian resources.

The greatest cumulative impacts to wetland, floodplain, and riparian resources within Walnut Canyon are attributable to the impoundment of Walnut Creek upstream from the monument at Upper and Lower Lake Mary. The lakes have prevented seasonal stream flows through Walnut Canyon since 1941. As a result, wetland and riparian resources in the canyon drainage system are believed to be experiencing a long-term decline. The processes of stream channel scouring, sediment transport, terrace formation, and local spring and seep recharge have been altered in response to the cessation of seasonal flows. Riparian vegetation cover and composition would continue to change, and a few obligate wetland and riparian plant species might become extirpated from the watershed.

The impoundments have also altered flood stages and flood risk areas. Since 1941, the canyon has flooded three times from extreme storm events that completely filled both lakes. Smaller magnitude flows or flash floods also occur approximately once a decade from tributary watersheds below the lakes. A failure of either Upper or Lower Lake Mary Dams would result in catastrophic damage to riparian resources within the monument. The lowest reach of the Island Trail could be within this flood stage, and the NPS would post warnings and consider closure of the trail should warnings of a possible dam failure be issued. The restoration of wetland, floodplain, and riparian resources would be predicated upon cooperation by the city of Flagstaff to provide regular seasonal water releases from Upper and Lower Lake Mary. Under the No-Action Alternative, continued disruption of flows within the watershed would have long-term, moderate adverse cumulative impacts to wetland, floodplain, and riparian resources within the monument.

Riparian resources within the Walnut Canyon watershed would remain buffered from water quality degradation by surrounding undeveloped Coconino National Forest and Arizona State trust lands. However, much of the land within the watershed lies within the Flagstaff city limits, and could potentially be acquired for development. The development of streets, residential, and commercial districts within the relatively pristine canyon watershed would increase non-point source pollution, such as wind-blown litter, motor and exhaust residue from streets, and fertilizers, herbicides, and pet waste from lawns. This would have long-term, minor to moderate

adverse cumulative impacts to riparian and wetland resources within Walnut Canyon National Monument.

CONCLUSION

Under the No-Action Alternative, continued NPS operations and visitor uses would have negligible impacts to wetland, floodplain, and riparian resources within the Walnut Canyon watershed. Fencing the 1996 boundary expansion areas along the canyon floor and closing the area to the general public would likely have negligible impacts, and excluding livestock grazing from the eastern boundary expansion area would likely have long-term, minor to moderate beneficial impacts. The historic Santa Fe dam would likely have negligible impacts because most storm flows pass through the dam's spillway.

The greatest impacts to wetland, floodplain, and riparian resources are attributable to cumulative impacts from upstream impoundments of Walnut Creek at Upper and Lower Lake Mary. Stream geomorphic processes, localized wetlands, and riparian vegetation would continue to experience a long-term decline in response to the cessation of seasonal flows. A few obligate wetland and riparian plant species might become extirpated from the monument. The impoundments have also altered flood stages and floodplain areas, and a dam failure would cause catastrophic damage to riparian resources within the monument. Continued disruption of flows within the watershed would have long-term, moderate adverse cumulative impacts to wetland, floodplain, and riparian resources within the monument.

Riparian resources within the Walnut Canyon watershed would remain buffered from water quality

degradation by surrounding undeveloped forest lands. Much of the land within the watershed could eventually be acquired for development by the city of Flagstaff. This would increase non-point source pollution, and have long-term, minor to moderate adverse cumulative impacts to riparian and wetland resources within Walnut Canyon National Monument.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Under Alternative 1, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those described for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would also have negligible impacts, as with the No-Action Alternative. The proposed new facilities along the existing access road would also be entirely within an upland environment and would have

negligible impacts to wetlands, floodplains, and riparian resources.

Approximately 2 miles of road would be built to provide a new scenic drive along the northeast canyon rim. The proposed road route is entirely within an upland environment, but would cross as many as five large tributary channels that drain from the northeast canyon rim into Walnut Canyon. The road would be properly designed to minimize interference with storm flows into the canyon. However, frequent vehicle use along the new road could potentially introduce trace amounts of non-point source pollution from motor and exhaust residue into the Walnut Canyon watershed. The proposed road along the northeast rim would likely have negligible to long-term, minor adverse impacts on riparian resources within the monument.

Under Alternative 1, dispersed guided hiking would be established in approximately 1/2 mile of riparian corridor along the east canyon floor. Dispersed hiking along the narrow riparian area would result in occasional trampling of intermittent channels, stream terraces, and riparian vegetation. Hiking would be prohibited in wetland areas. Depending upon the level of disturbance, stream banks and terraces could erode more easily during infrequent flash floods. This impact would probably be offset by fencing the 1996 boundary and excluding livestock from the east canyon floor. The proposed visitor access to riparian resources would likely result in negligible to long-term, minor adverse impacts to riparian resources and floodplains within the monument.

CUMULATIVE EFFECTS

The cumulative impacts of Alternative 1 on wetlands, floodplains, and riparian resources would be the same as those described for the No-Action Alternative.

CONCLUSION

Under Alternative 1, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those described for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would also have negligible impacts, as with the No-Action Alternative. The proposed new facilities along the existing entrance road would be entirely within an upland environment and also would have negligible impacts to wetlands, floodplains, and riparian resources.

Approximately 2 miles of road would be built along the northeast canyon rim and would cross tributary drainages of Walnut Canyon. Frequent vehicle use along the new road could potentially introduce trace amounts of non-point source pollution from motor and exhaust residue into the Walnut Canyon watershed. The proposed road would likely have negligible to long-term, minor adverse impacts on riparian resources. Dispersed guided hiking would occur in 1/2 mile of riparian corridor along the east canyon floor, increasing disturbance to stream banks, terraces, and riparian vegetation. This impact would probably be offset by fencing the 1996 boundary to exclude livestock grazing. Visitor use within this area

would likely result in negligible to long-term, minor adverse impacts.

The cumulative impacts of Alternative 1 on wetlands, floodplains, and riparian resources would be the same as those identified for the No-Action Alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Under Alternative 2, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those described for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would also have negligible impacts, as with the No-Action Alternative. The proposed new visitor center along the existing access road would be entirely within an upland environment and also would have negligible impacts to wetlands, floodplains, and riparian resources.

An existing primitive road through the adjacent Coconino National Forest

would be upgraded to provide visitor access to the northeast canyon rim. The route is entirely within an upland environment, but would traverse the head of a major tributary canyon that drains into Walnut Canyon. The road would be properly designed to minimize interference with storm flows into the canyon. The road would be infrequently used for guided tours only, and would likely generate negligible non-point source pollution from motor and exhaust residue. The proposed road would likely have negligible impacts on wetlands, floodplains, and riparian resources within the Walnut Canyon watershed.

Under Alternative 2, dispersed guided hiking would be established in approximately 2 miles of riparian corridor along the east canyon floor. Dispersed hiking along the narrow riparian area would result in occasional trampling of intermittent channels, stream terraces, and riparian vegetation. Hiking would be prohibited in wetland areas. Depending upon the level of disturbance, stream banks and terraces could erode more easily during infrequent flash floods. This impact would probably be offset by fencing the 1996 boundary and excluding livestock grazing from the east canyon floor. The proposed visitor access to riparian resources would likely result in negligible to long-term, minor adverse impacts to wetlands, floodplains, and riparian resources within the monument.

CUMULATIVE EFFECTS

The cumulative impacts of Alternative 2 on wetlands, floodplains, and riparian resources would be the same as those identified for the No-Action Alternative.

CONCLUSION

Under Alternative 2, continued NPS operations and visitor activities above the north canyon rim would have negligible impacts, as with the No-Action Alternative. The impacts of fencing the 1996 boundary expansion areas would be the same as those identified for the No-Action Alternative. The continued existence of the Santa Fe Dam within the monument would also have negligible impacts, as with the No-Action Alternative. The proposed new visitor center along the existing entrance road would be entirely within an upland environment and also would have negligible impacts to wetlands, floodplains, or riparian resources.

An existing primitive road would be upgraded to provide visitor access to the northeast canyon rim. The road would be properly designed to minimize drainage interference, would be used infrequently, and non-point source pollution from motor and exhaust residue would be minimal. The proposed road would likely have negligible impacts. Dispersed hiking would occur in 2 miles of riparian corridor along the east canyon floor, increasing disturbance to stream banks, terraces, and riparian vegetation. This impact would probably be offset by fencing the 1996 boundary to exclude livestock grazing. Visitor access within this area would likely result in negligible to long-term, minor adverse impacts.

The cumulative impacts of Alternative 2 on wetlands, floodplains, and riparian resources would be the same as those identified for the No-Action Alternative.

Because there would be no major adverse impacts to resources whose

conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible/irretrievable commitments of wetlands, floodplains, or riparian resources.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There would be no short-term gains that result in long-term loss of availability or productivity of wetlands, floodplains, or riparian resources.

Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts from NPS operations or visitor activities under the No-Action Alternative. Under Alternative 1, the proposed road along the northeast canyon rim could increase non-point source pollution within the Walnut Canyon watershed and have long-term, minor adverse impacts to riparian resources within the monument. Under Alternatives 1 and 2, dispersed guided hiking activity along the eastern canyon floor would have negligible to long-term, minor

adverse impacts to riparian and floodplain resources, but these impacts would likely be offset by fencing the monument boundary to exclude livestock from this area. Unavoidable adverse cumulative impacts to wetland, floodplain, and riparian resources within the monument would continue from upstream impoundments at Upper and Lower Lake Mary.

ABILITY TO EXPERIENCE PARK RESOURCES

This topic includes analysis of the following broad areas: access to park resources by the general public and by visitors with disabilities; the ability to see the real thing and the ability to experience a minimally affected environment; and the ability of the public to understand park resources and the regional context of the park. Also analyzed were the ability to exercise personal freedom during a park visit, the provision of traditional employee/visitor experiences (interpretation through personal services, and access to favorite sites), and the ability to participate in traditional recreational activities (biking, climbing, OHV use, etc.).

Methodology

Visitor surveys and personal observation of visitation patterns combined with assessment of what is available to visitors under current management were used to estimate the effects of the actions in the various alternatives. The impact on the ability of the visitor to experience a full range of park resources was analyzed by examining resources mentioned in the park significance statement.

Negligible: The impact is barely detectable and/or will affect few visitors.

Minor: The impact is slight, but detectable, and/or will affect some visitors.

Moderate: The impact is readily apparent and/or will affect many visitors.

Major: The impact is severely adverse or exceptionally beneficial and/or will affect the majority of visitors.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Access to Park Resources by the General Public and for Visitors with Disabilities

Under this alternative, visitor opportunities to experience park resources at Walnut Canyon National Monument would remain concentrated within a small portion of the canyon; the types of experiences would be essentially the same as those that have been available for the past several decades. For the majority of visitors, a one- to two-hour trip incorporating the visitor center museum and observation room, the Island Trail, and/or the Rim Trail would continue to constitute the entire Walnut Canyon experience. This provides only a glimpse of the total resources contained within the canyon and the monument, although this fact might not be evident to all visitors. In a 1998 survey (Lee and Treadwell 1999), visitors were asked what things they would like to see changed at Walnut Canyon. The most common answer (15%) was "nothing." However, specific requests

included more trails, including one to the bottom of the canyon; improvements to existing trails; more guided hikes, films exhibits, and information; more access to other monument areas, more access for persons with disabilities, and numerous other changes.

In the 1999 Visitor Survey Card (Machlis 2000) approximately 96% of visitors expressed overall satisfaction with their visit. This reflects the proportion of visitors who rated existing facilities (rest rooms, visitor centers, picnic area, exhibits, services, and recreational opportunities as very good or good. Significantly, only 58% of these same visitors demonstrated understanding of the significance of the park. This reflects limitations of existing interpretive media, coupled with a lack of visitor access to the full range of resources that could contribute to full understanding and indicates a moderate adverse impact.

Because access to the canyon floor is prohibited within the monument, visitors lack the opportunity to experience the canyon's riparian zone and the meanders and seeps so characteristic of this canyon. The desire to hike to the canyon bottom is occasionally expressed by visitors, and a few (3 of 304 surveyed) mentioned this as one of the things that bothered them about their visit. A larger number (16 of 304) listed this as a change they wanted to make to the park. This is a minor adverse impact to this group of visitors.

The visitor center/museum/observation room has been modified to provide full accessibility, via temporary wheelchair lifts. All visitors now have access to the information desk for personal interactions with park staff, to museum exhibits, the publications

sales area, and the observation room and adjacent outdoor patio, both of which provide views into the canyon. Although planned interpretive improvements would serve visitors with other impairments, there are currently no specialized provisions for these groups. Impacts on visitors with disabilities are moderate and beneficial in the visitor center area, depending on individual abilities.

Visitors with mobility disabilities have difficulty reaching even a limited range of park resources elsewhere. Access to cliff dwellings, located along the Island Trail, cannot be provided because of canyon terrain; no equivalent experience is currently available. The Rim Trail, which provides an overlook and view of the canyon and cliff dwellings, is currently accessible to mobility impaired visitors for approximately 100 yards. A pueblo and pithouse, located at the end of the trail, could be accessible for some, with assistance. This is moderate adverse impact for those who are physically unable to negotiate park trails and are therefore unable to experience any actual structures. However, accessibility to the pithouse and pueblo is being planned concurrent with the GMP.

The quality of this visitor experience is high, although limited by the area available for visitation. The view from the visitor center interior is overwhelming. From here people can see up and down the canyon, across to the south side, and have a fair view of the San Francisco Peaks. Looking at scenery was a very popular activity, identified by 90% of visitors (Lee and Treadwell 1999). It was followed by looking at visitor center exhibits (84%), hiking/walking (83%), and taking pictures (82%). Continuation

of these activities is of major, long-term benefit to visitors.

Access to Information Provided by Collections (Ability to see the "Real Thing") and to a Minimally Altered Environment

A number of the park's cliff dwellings can be viewed, visited, and even entered along the Island Trail, and this provides a sense of what the rest of the monument is like. Views of cliff dwellings and access to two other structure types, a pithouse and a pueblo, are provided from the Rim Trail. Guided walks to the historic ranger cabin are available on a limited, seasonal basis. A small number of artifacts are on display in the visitor center. Exploring the ruins is important to 83% of Walnut Canyon visitors surveyed, as are touching and being close to ruins and seeing how prehistoric people lived. Under current conditions, access to numerous cliff dwellings is a major benefit to visitors able to hike the Island Trail. However, other visitors and those interested in other types of dwellings and/or artifacts experience moderate adverse impacts.

To many visitors, the forested Walnut Canyon environment appears natural and minimally altered, despite past changes resulting from logging and dam building (which virtually eliminated water flow through the canyon). "To be in a forested setting" was rated as moderately important by visitors, and this is achieved along the 3-mile entrance road, at adjacent picnic areas, and along interpretive trails. All of these are located within the small area available for concentrated public use and are subject to the sights and sounds of traffic, other visitors, and modern facilities. The ability to experience this

perceived natural environment is a moderate benefit available to all visitors; the inability to venture farther from the modern human environment represents a minor to moderate adverse impact.

It is often difficult to find solitude in this park for more than a few moments at a time. According to park staff, crowding is common seasonally and can be very severe for short periods of time. Visitation is concentrated in a relatively small area. This is especially true in spring, when numerous school groups visit simultaneously. However, according to the visitor survey, visitors do not generally feel crowded. On a scale of 1 = not at all crowded and 9 = extremely crowded, responses averaged 2.5. A few praised the lack of crowds. However, 20% said there were places where they felt particularly crowded-mentioned were the Island Trail and the visitor center, the two primary visitor use areas.

Annual visitation at Walnut Canyon increased 74%, from 70,585 in 1979 to 122,544 in 1999. The perceived uncrowded atmosphere is a moderate benefit to today's visitors; deterioration of this quality would be a moderate adverse impact.

Sunsets, sunrises, and the night sky are outside of normal visitor experience because the park is open at most from 8 a.m. to 6 p.m. Crepuscular and nocturnal animals are also not observed by visitors because of the park closure times. Exceptions occur occasionally during summer evening programs. Impact on the park experience is negligible.

Natural sounds, particularly those of birds and of wind in the trees, predominate at times. However, most locations are within sight or sound of

the visitor center, parking area, entrance road, and/or other visitors. Occasional intrusion is created by visitors yelling into or across the canyon to produce echoes. Sounds, smells, tranquility, peace and quiet, and related topics were mentioned by many people as things they most enjoyed about their visit to Walnut Canyon. Preservation of this aspect is a major long-term benefit.

Visitor activities are fairly regimented, with use restricted to established roads and trails. Access to the ranger cabin and other resources is limited to ranger-guided tours. However, a variety of less-structured opportunities exist immediately outside park boundaries on USFS lands making this impact negligible to minor for most visitors.

Effects on Ability of Public to Understand Park Resources and Regional Context

The biodiversity of Walnut Canyon is interpreted in the visitor center and along the Rim and Island Trails. People can discern broad changes in vegetation on the different slopes, top, and bottom of the canyon and gain understanding of the importance of native plants to prehistoric peoples.

Museum exhibits, wayside exhibits along the two trails, ranger-guided tours, and sales publications interpret various cultural and natural features as well as the lifeways of the people who lived in the dwellings. Exhibits are generally outdated and inaccurate, and regional contexts of cultural and natural resources are not adequately presented. In particular, the oral history of contemporary native tribes and the links between past and present cultures are not evident to the majority of visitors. Even so, interpretive efforts are

moderately effective: in 1999, 58% of visitors demonstrated understanding of the significance of the monument, as measured by the Visitor Survey Card project (Machlis 2000). The current lack of a complete and coherent interpretive story is a moderate adverse impact to park visitors. A major interpretive planning effort to replace wayside interpretive signs along trails and roadsides and to redo museum exhibits in the visitor center is under way, concurrent with this general management plan. The result will be a moderate benefit for all visitors.

Traditional interpretive services would continue as in the past, consisting primarily of self-guiding trails, ranger-led hikes, and occasional cultural demonstration programs. Of visitors surveyed (Lee and Treadwell 1999), 27% reported talking to a ranger or listening to an interpretive talk. Continuation of these activities would be of moderate to major importance, both for conveying understanding to visitors and for decreasing physical impacts and ensuring preservation of resources.

CUMULATIVE EFFECTS

The geographic area considered for cumulative effects for this alternative includes the Flagstaff Area monuments, the greater Flagstaff area, and the most adjacent portions of the Coconino National Forest.

In addition to the impacts described above, external forces and actions of other entities could affect visitor ability to experience park resources in this alternative. Primary sources of these additional impacts are the USFS, Grand Canyon National Park, and local residents. Additional detail follows for each.

USFS management actions within the area of consideration could work in combination to increase total visitation to Walnut Canyon. These include:

- Forest closures and/or increasing restrictions, fire hazard closures, and similar changes could transfer some visitors to the park.
- USFS "Company's Coming" program and visitor facility expansion could increase interest in visiting nearby park facilities.

Increased visitation for any of these reasons would impact uncrowded visitor experiences within the park, probably to a minor degree at any given time. Increased visitation to the park could be offset by increased use of the forest by traditional park visitors. In this alternative, visitors perceive a generally uncrowded environment from NPS actions and consider this a major benefit. However, visitation projections indicate that crowding would be inevitable within the lifetime of this plan and would become a moderate adverse impact. The cumulative impact would be moderate and adverse.

Changes in visitor use patterns and transportation at Grand Canyon National Park could result in visitation changes at Walnut Canyon:

- visitation could increase, especially by those seeking the independent drive-through experience no longer available at Grand Canyon.
- visitors arriving from Grand Canyon could have more time to spend, because of traffic management there (no stops at viewpoints).

Increased visitation and/or increased length of stay would impact uncrowded visitor experiences within

the park, probably to a minor degree. In this alternative, visitors perceive a generally uncrowded environment from NPS actions and consider this a major benefit. However, visitation projections indicate that crowding would be inevitable within the lifetime of this plan and would become a moderate adverse impact. The cumulative impact would be moderate and adverse. Increased length of stay by visitors would also impact ability to understand park resources, since these visitors would probably devote more time to visitor center exhibits, wayside exhibits, interpretive programs, or otherwise learning about the park. In this alternative, a major benefit would be expected from NPS actions. The cumulative effect would be the same.

Increased growth of Flagstaff could increase park visitation by local residents. Possible effects:

- visitation could increase
- the number of repeat visits could increase, as residents return for more information and/or additional experiences
- use of park resources for traditional recreational activities (biking, hiking, etc.) could increase

Increased visitation would impact uncrowded visitor experiences as described above, probably to a minor degree. Cumulative impact would remain moderate and adverse. Repeat visits could impact demand for traditional employee/visitor experiences and encourage more variety in interpretive programs offered. In this alternative, this would be a moderate to major benefit to visitors. In this alternative, for traditional recreational activities, minor to moderate benefits would be

expected. Addition of such activities would be of negligible impact.

Summary. In this alternative, cumulative impacts of NPS and external actions would cause no measurable change to visitor ability to experience park resources.

CONCLUSION

The No-Action Alternative would result in moderate benefits for many visitors, particularly those with an interest in cliff dwellings and with the physical ability to walk to them. Recently improved access to the visitor center and its resources represents a major benefit for visitors with physical disabilities and those wishing to examine exhibits and artifacts. Continuation of traditional interpretive programs would provide moderate benefits for all visitors in understanding of park resources and their significance. The ability to enjoy the scenery and a minimally altered environment, and to do so in a relatively quiet, uncrowded atmosphere, would continue as a moderate benefit in the near future, but would be increasingly impacted by expected visitation increases in the future.

This alternative would result in minor adverse impacts to visitor experience by continuing to limit access to the full range of park resources, including the opportunity to visit prehistoric sites other than cliff dwellings. Visitors with disabilities would suffer moderate adverse impacts due to continued inaccessibility of most structures and other resources related to park significance. Some visitors will experience minor to moderate adverse impacts from the lack of opportunity to explore beyond the limited developed area now available

for public use. There are also impacts that are less severe.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

Effects on Access to Park Resources by the General Public and for Visitors with Disabilities

This alternative would expand the area open to visitation to include more of the park's variety of natural and cultural resources. The canyon floor, and associated habitats and microclimates would remain closed, as would the south rim. More of the north rim and more archeological sites would be available, allowing visitors a more complete understanding of the kinds of archeological structures that make Walnut Canyon unique: they could visit cliff dwellings, rim structures, First Fort, and the historic ranger cabin. New guided walks would be provided to archeological sites along the east and west rims of Walnut Canyon, and an existing gravel road would be upgraded to provide a new scenic drive, with interpretive

waysides, along the north rim. The opportunity to experience this greater diversity of sites and their settings would be a moderate benefit to overall visitor experience.

Offices would be removed from the visitor center, creating space for expanded museum exhibits and interpretive programs and contributing to greater visitor understanding and appreciation of both cultural and natural resources. This would be a moderate benefit for visitors. Moderate short-term adverse impacts would occur for visitors during visitor center remodeling, when access to exhibits would be limited or nonexistent. However, this impact would be mitigated by increased ranger presence, special interpretive programs, and temporary exhibits.

Remodeling of the visitor center and construction of a trail from the new parking area would include a fully accessible design, to replace the existing wheelchair lifts and eliminate barriers for visitors with all types of disabilities. New museum exhibits would be designed for universal accessibility. Guided motorized trips would provide new opportunities to experience First Fort and other archeological sites firsthand, allow more opportunities to view wildlife habitats, and make natural soundscapes and natural environments more accessible to all. As described in the No-Action Alternative, the Rim Trail would be improved to provide accessibility for visitors with mobility impairments. These improvements would be a major benefit.

The south rim of the canyon would remain closed to visitation. This would be a negligible to minor impact,

based on the number of these park users.

Hiking, biking, and horseback riding would occur on existing roads and trails on the rim in portions of the newly acquired lands in the western part of the monument. Climbing would be redirected to locations outside the park. New orientation and interpretive exhibits at trailheads, road junctions, and the park entrance would inform visitors of recreational opportunities available within the park and on adjacent lands. Impacts would range from minor adverse for those whose preferred uses would be removed from the park to minor benefit because of the availability of increased information.

Effects on Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

Cliff dwellings, a pithouse, and a pueblo would still be available via the Island and Rim Trails, as described under the No-Action Alternative. Additional dwellings could be viewed from a distance on guided tours and along the new scenic drive. Also, First Fort would be opened to visitation on guided tours, providing visitors the opportunity to experience firsthand one of the sites that makes Walnut Canyon's archeology unique. The remodeled visitor center would provide space for new interpretive exhibits and the display of a greater diversity of artifacts. All of these expanded experiences would provide moderate beneficial impacts for park visitors.

As described under the No-Action Alternative, the Walnut Canyon environment is perceived by many visitors as less altered than it actually

is, even within the existing developed area. This alternative would expand access to a natural-appearing environment along more of the canyon rim and would provide new opportunities to leave the modern human environment, via guided tours and the new scenic drive. This would be a moderate beneficial impact for park visitors.

In addition, guided tours would provide an opportunity to compare firsthand the differences between relatively undisturbed archeological sites and the highly stabilized sites along the Island Trail. The No-Action Alternative provides fewer such opportunities because visitor attention is directed primarily to structures that are already impacted and stabilized. This would result in moderate benefits to visitors.

More views of the meandering nature of the canyon and of the San Francisco Peaks would be available from the rim trails and scenic drive. Removal of congestion from the canyon's edge might increase the chances of visitor encounters with wildlife. The Natural Area Recreation Zone in the western part of the park would provide an even greater opportunity for viewing wildlife because fewer people would be likely to visit this area. Because time is limited for most Walnut Canyon visitors, not all would take advantage of these new opportunities. Beneficial impact would be minor to moderate.

The opportunity for visitors to experience solitude would be enhanced in this alternative. In contrast to the relatively congested visitor center and Island and Rim Trail areas, guided tours along the rims would provide opportunities for small groups of people to enjoy quiet areas of the park. Spreading out use

through a larger area of the park would mean that encounters with other visitors (even in the busier areas) would be reduced as well; it would also mitigate future expected visitation increases. Preservation of uncrowded experiences would be a moderate benefit for all visitors.

Impact to night skies would remain a negligible impact, as in the No-Action Alternative.

Physical alterations related to this alternative (construction of the new office building, parking lot and trail, and remodeling of the visitor center) would result in moderate, but short-term, adverse impacts for visitors present during the construction period.

Removal of the activity and noise associated with a busy parking lot would increase visitors' ability to enjoy the natural sounds of the canyon and enhance opportunities to see and hear wildlife along the rim. This would be a moderate long-term beneficial impact for all park visitors.

Because the guided activities would limit numbers of people and because they would emphasize places farther from the developed area, visitors would have a greater opportunity to experience natural soundscapes. However, they would not be able to explore these areas alone. This would be a moderate benefit to park visitors.

Effects on Ability of Public to Understand Park Resources and Regional Context

Offices would be removed from the visitor center, allowing the entire building to be remodeled for a variety of visitor orientation, interpretation, and education programs that are not feasible under the No-Action Alternative. Space available for

museum exhibits would increase, and more artifacts would be displayed. Expanded cultural demonstration programs would more readily convey the links between the "old ways" of the Sinagua and the contemporary lifeways of American Indians. Indoor meeting space in which to assemble a group of visitors, especially in bad weather, would be available for the first time, and interpretive programs would no longer be dependent on weather. Increased quantity and quality of interpretation in and near the visitor center, at trailheads, and at the park entrance would provide a major benefit to visitor understanding and ability to experience the park.

Significantly different types of archeological sites would be open to visitation via guided trips, allowing greater understanding of the complete cultural history of the area. New wayside exhibits would help visitors understand the relationship of natural resources to the lives of cultures both past and present. This would be a moderate benefit to park visitors.

Interpretive programs would continue as described under the No-Action Alternative, and additional guided tours, both walking and driving, would be offered in areas not previously open to the public. Indoor space would be available in the remodeled visitor center for cultural demonstrations, interpretive talks, and other programs. These additional programs would be a moderate benefit.

CUMULATIVE EFFECTS

The geographic area considered for cumulative effects for this alternative includes the Flagstaff Area monuments, the greater Flagstaff

area, and the most adjacent portions of the Coconino National Forest.

In addition to the impacts described above, external forces and actions of other entities could affect visitor ability to experience park resources in this alternative. Primary sources of these additional impacts are the USFS, Grand Canyon National Park, and local residents. Additional detail follows for each.

USFS management actions within the area of consideration could work in combination to increase total visitation to Walnut Canyon. These include:

- Forest closures and/or increasing restrictions, fire hazard closures, and similar changes could transfer some visitors to the park.
- USFS "Company's Coming" program and visitor service facility expansion could increase interest in visiting nearby park facilities.
- New information services could spread visitor use more evenly over facilities and features of both agencies.

Increased visitation for any of these reasons would impact uncrowded visitor experiences within the park, probably to a minor degree at any given time. Increased visitation to the park could be offset by increased use of the forest by traditional park visitors. In this alternative, a major benefit is expected from NPS actions. The cumulative impact would remain the same.

Changes in visitor use patterns and transportation at Grand Canyon National Park could result in visitation changes at Walnut Canyon:

- visitation could increase, especially by those seeking the independent

drive-through experience no longer available at Grand Canyon.

- visitors arriving from Grand Canyon could have more time to spend, because of traffic management there (no stops at viewpoints).

Increased visitation and/or increased length of stay would impact uncrowded visitor experiences within the park, probably to a minor degree. In this alternative, a major benefit is expected from NPS actions. Increased length of stay by visitors would also impact ability to understand park resources, since these visitors would probably devote more time to visitor center exhibits, wayside exhibits, interpretive programs, or otherwise learning about the park. In this alternative, a major benefit would be expected from NPS actions. The cumulative effect would be the same.

Increased growth of Flagstaff could increase park visitation by local residents. Possible effects:

- visitation could increase
- the number of repeat visits could increase, as residents return for more information and/or additional experiences
- use of park resources for traditional recreational activities (biking, hiking, etc.) could increase

Increased visitation would impact uncrowded visitor experiences as described above, probably to a minor degree. Repeat visits could impact demand for traditional employee/visitor experiences, and encourage more variety in interpretive programs offered. In this alternative, this would be a major benefit to visitors. In this alternative, for traditional recreational activities, impacts ranging from minor adverse to minor benefit would be expected

from NPS actions. Additional such activities would be of negligible impact. Cumulative impacts would remain the same.

Summary. In this alternative, cumulative impacts of NPS and external actions would cause minor change to visitor ability to experience park resources.

CONCLUSION

This alternative would result in major benefits to visitors wishing to experience a greater variety of park resources than are available under the No-Action Alternative. Removal of offices from the visitor center would alleviate crowding and create space for new expanded museum exhibits, artifact displays, and indoor interpretive programs for visitors and organized school groups—all major benefits for visitor understanding and viewing of the "real thing."

Remodeling of the visitor center would also provide major benefits in accessibility: physical barriers (multiple building levels and stairs) would be resolved to provide full accessibility and exhibits would be designed for use by visitors with a variety of physical and mental impairments. A new scenic drive would provide views of additional cliff dwellings and other types of structures, some relatively undisturbed, which are not available under the No-Action Alternative. This experience would be accessible.

Removal of the busy parking lot from the canyon rim and spreading out use along the rim would create a less crowded visitor experience and enhance the ability to hear natural sounds, both moderate benefits. Because all visitors would no longer be confined to the existing developed area, there would be opportunities to experience new scenic views of

Walnut Canyon and to enjoy a minimally altered environment, both moderate benefits. Traditional interpretive programs and cultural demonstrations would continue (a moderate benefit), together with new guided tours of the scenic drive and hike to First Fort.

This alternative would result in moderate short-term adverse impacts to several aspects of visitor experience during construction and remodeling of the existing developed area, but these would be short term. There would be minor to moderate impacts to personal freedoms and traditional recreational activities resulting from zoning of newly acquired lands and removal of some uses from the park. These impacts would be partially mitigated by increased on-site information on regional recreational opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

Effects on Access to Park Resources by the General Public and for Visitors with Disabilities

In this alternative, the visitor center function would be relocated to the I-40 junction, creating a quieter experience within and on the rim of the canyon. The existing visitor center building would be restored to its original CCC configuration to preserve canyon views. This would be a major benefit, affecting all visitors.

A more complete understanding of the kinds of archeological structures that make Walnut Canyon unique would be available to visitors: they could experience cliff dwellings, rim structures, First Fort, and the historic ranger cabin. Visitors would also have greater opportunities to experience natural habitats, including the canyon floor and its regionally rare riparian communities. Most of these experiences would occur via guided tours and would constitute a moderate benefit. The Island Trail would remain as in the No-Action Alternative, and the Rim Trail would be improved for greater accessibility.

The western end and the south side of the park would be closed to visitation; a minor adverse impact based on current use levels.

Remodeling of the existing visitor center and construction of the new visitor center building at I-40 would ensure full accessibility to both structures for visitors with physical, hearing, vision, mental, and other disabilities. Exhibits and services

would be designed for universal accessibility and would include equivalent experiences for those resources that could not be made accessible. This would be a moderate beneficial impact.

Resources along the Island Trail would remain inaccessible to the physically impaired, because of terrain. The Rim Trail would be improved to provide full accessibility at least to the pithouse and pueblo, in addition to the existing accessible overlook. Improved accessibility to a wider range of resources would be a major benefit. Ranger-led walks along the rims, to First Fort, and into the canyon would be on rough terrain, preventing most visitors with physical disabilities from entering these newly opened areas. Adverse impacts would still exist, because not all natural and cultural sites could be visited, but these impacts would be mitigated by alternative experiences incorporated into visitor center exhibits and possibly elsewhere.

Changing the existing visitor center back to its original CCC configuration would enhance the scenic quality of views from the Island Trail. This would be a minor beneficial impact for park visitors.

People could view more of the meandering nature of this canyon from the rim and from within the canyon than under the No-Action Alternative. Unique scenic perspectives would be seen from within the canyon, and additional wildlife sightings would be possible. This would be a moderately beneficial impact for park visitors.

The south rim of the canyon would be closed to visitation; the relatively small amount of visitor use that previously took place informally there

and within newly acquired portions of the monument would not be permitted under the zoning of this alternative. This would be a negligible to minor impact, based on the number of these park users.

Personal freedoms might be restricted at times, depending on the future need to regulate visitation numbers. Those visitors arriving at peak times might be unable to visit when they wished, or might be required to arrive by some form of shuttle vehicle. This would be a moderate to major adverse impact, but would be offset by the benefits described above (effects on uncrowded visitor experiences) for those allowed to enter the park.

Hiking, biking, and horseback riding would be directed to the Arizona Trail and other areas outside the park. The adverse impact would be negligible to minor.

Effects on Access to Information Provided by Collections (Ability to See the "Real Thing") and to a Minimally Altered Environment

Cliff dwellings, a pithouse, and a pueblo would be available via the Island and Rim Trails, as described under the No-Action Alternative. The historic ranger cabin would be considered for a self-guided trail, rather than guided access only, as in the No-Action Alternative. First Fort would be opened to visitation on guided tours (involving a drive along existing U.S. Forest Service roads and an extended hike), providing visitors the opportunity to experience firsthand one of the sites that makes Walnut Canyon's archeology unique. The new visitor center would provide space for new interpretive exhibits and the display of more artifacts.

More specialized information and assistance would be available at the remodeled CCC building, which could also be appreciated for its historic architecture and relationship to park history. Collectively, these expanded experiences would provide major benefits for park visitors.

Guided hikes would provide an opportunity for visitors to experience the canyon floor and its associated biological communities.

As described under the No-Action Alternative, the Walnut Canyon environment is perceived by many visitors as less altered than it actually is, even within the existing developed area. This alternative would expand access to a natural-appearing environment along more of the canyon rim and in the canyon bottom and would provide new opportunities to leave the modern human environment, via guided tours. This would be a moderate beneficial impact for park visitors.

Removal of existing facilities near the rim would result in moderate short-term adverse impacts during the demolition period. Long-term impacts, following rehabilitation and revegetation of the area, would be moderately beneficial by providing more natural surroundings.

In addition, guided tours would provide an opportunity to compare firsthand the differences between relatively undisturbed archeological sites and the highly stabilized sites along the Island Trail. The No-Action Alternative provides no such opportunity, since visitors encounter only structures that have already been impacted and stabilized. This would result in moderate benefits both to visitors and to archeological sites,

owing to greater appreciation for their fragility.

The opportunity for visitors to experience solitude would be greatly enhanced in this alternative by removing most facilities from the canyon rim. Spreading out use through a larger area of the park would mean that encounters with other visitors (even in the busier areas) would be lessened as well. The possibility of regulating numbers of visitors would ensure less crowded conditions in the park if/when faced with future visitation increases. There would be a moderate to major beneficial impact to park visitors afforded a relatively uncrowded experience.

Sunsets, sunrises, and the night sky would be outside of normal visitor experience because the park and entire entrance road would be closed at night. Crepuscular and nocturnal animals would also not be observed by visitors because of the park closure times. Exceptions occur occasionally during summer evening programs. This would remain a negligible impact, as in the No-Action Alternative.

Physical alterations related to remodeling of the visitor center and vicinity would result in moderate to major, but short-term, adverse impacts for visitors present during the construction period.

The natural soundscapes and tranquil setting of the canyon would be enhanced by removing most facilities from the rim. This action would enhance visitor ability to enjoy the natural sounds of the canyon and opportunity to see and hear wildlife along the rim. This would be a major long-term beneficial impact for all park visitors.

Because the guided activities would limit numbers of people and because they would venture to places more removed from the developed area of the park, visitors would have a greater opportunity to experience natural soundscapes. This would be a moderate benefit to park visitors.

Effects on Ability of Public to Understand Park Resources and Regional Context

Construction of the new visitor center at the I-40 junction would provide orientation and interpretation for visitors before they encounter park resources and would enhance their ability to plan their activities. Space would be available for enhanced museum exhibits, artifact displays, interpretive programs, and educational programs for large groups. Additional cultural demonstrations could be provided for larger groups of visitors. Such programs readily convey the links between the "old ways" of the Sinagua and the contemporary lifeways of American Indians. The existing CCC visitor center would provide in-depth learning opportunities in a more personal setting. These changes in fixed interpretive services would be a major beneficial impact to visitors.

Physical alterations related to remodeling of the existing visitor center building and vicinity would result in moderate to major, but short-term, adverse impacts for visitors present during the construction period. Most impacts could be mitigated by ensuring completion of the new visitor center, complete with interpretive exhibits, first.

Interpretive programs would continue as in the No-Action Alternative,

except that the ranger cabin might be a self-guided experience rather than ranger-led.

Opportunities for in-depth interpretive and educational presentations would increase, using the remodeled CCC visitor center. The new visitor center would offer additional opportunities for visitor interactions with rangers.

Significantly different sites would be open to visitation via longer guided hikes, allowing greater understanding of the complete cultural history of the area. Impact would be moderate to major benefits.

CUMULATIVE EFFECTS

The geographic area considered for cumulative effects for this alternative includes the Flagstaff Area monuments, the greater Flagstaff area, and the most adjacent portions of the Coconino National Forest.

In addition to the impacts described above, external forces and actions of other entities could affect visitor ability to experience park resources in this alternative. Primary sources of these additional impacts are the USFS, Grand Canyon National Park, and local residents. Additional detail follows for each.

USFS management actions within the area of consideration could work in combination to increase total visitation to Walnut Canyon. These include:

- Forest closures and/or increasing restrictions, fire hazard closures, and similar changes could transfer some visitors to the park.
- USFS "Company's Coming" program and facility expansion could increase interest in visiting nearby park facilities.

- Management of the new visitor center could spread visitor use more evenly over facilities and features of both agencies.

Increased visitation for any of these reasons would impact uncrowded visitor experiences within the park, probably to a minor degree at any given time. Increased visitation to the park could be offset by increased use of the forest by traditional park visitors. In this alternative, a moderate benefit is expected from NPS actions. The cumulative impact would remain the same.

Changes in visitor use patterns and transportation at Grand Canyon National Park could result in visitation changes at Walnut Canyon:

- visitation could increase, especially by those seeking the independent drive-through experience no longer available at Grand Canyon.
- visitors arriving from Grand Canyon could have more time to spend, because of traffic management there (no stops at viewpoints).

Increased visitation and/or increased length of stay would impact uncrowded visitor experiences within the park, probably to a minor degree. Increased length of stay by visitors would also impact ability to understand park resources, since these visitors would probably devote more time to visitor center exhibits, wayside exhibits, interpretive programs, or otherwise learning about the park. In this alternative, moderate to major short-term adverse impacts and major benefits would be expected from NPS actions. The cumulative effect would be the same.

Increased growth of Flagstaff could increase park visitation by local residents. Possible effects:

- visitation could increase
- the number of repeat visits could increase, as residents return for more information and/or additional experiences
- use of park resources for traditional recreational activities (biking, hiking, etc.) could increase

Increased visitation would impact uncrowded visitor experiences as described above, probably to a minor degree. Repeat visits could impact demand for traditional employee/visitor experiences and encourage more variety in interpretive programs offered. In this alternative, this would be a moderate to major benefit to visitors. For traditional recreational activities, impacts ranging from negligible to minor adverse would be expected from NPS actions. Additional such activities would be of negligible impact. Cumulative impacts would remain the same.

Summary. In this alternative, cumulative impacts of NPS and external actions would cause no measurable change to visitor ability to experience park resources.

CONCLUSION

This alternative would result in moderate benefits to visitors wanting a quieter, more educational experience at Walnut Canyon. The visitor center function would be relocated near the I-40 junction; the existing building would be restored to its original Civilian Conservation Corps (CCC) configuration. This would reduce intrusion of modern structures on the natural and historic scene and enhance views from the rim and from the Island Trail. Other benefits would include ability to hear natural sounds, see a minimally altered environment, and enjoy a less crowded experience

throughout the park. The new visitor center would provide space for new museum exhibits, artifact displays, cultural demonstrations, and indoor interpretive programs for visitors and organized school groups. Traditional interpretive programs would continue, and new longer guided tours and hikes would be added to provide moderate benefits.

A greater variety of natural and archeological resources would be available via guided tours and/or self-guided trails. These would include the canyon floor, First Fort, the ranger cabin, and other dwellings, in addition to those available under the No-Action Alternative, and would constitute a moderate to major benefit.

The new visitor center and its exhibits would be fully accessible to visitors with a variety of physical and mental impairments, and would provide equivalent experiences for resources which, because of canyon terrain, cannot be made accessible. More features would be accessible than under the No-Action Alternative: the Rim Trail would be improved to provide access at least to the pithouse and pueblo, and a self-guiding trail to the historic ranger cabin would be accessible. These would be moderate benefits. Ranger-led walks to First Fort and into the canyon, however, could not be made accessible.

This alternative would result in major adverse impacts to several aspects of visitor experience during construction and remodeling in the existing developed area, but these would be short-term. This alternative would consider reservation and/or shuttle systems if necessary to control visitation numbers. Moderate adverse impacts on personal freedoms could result if such systems were

implemented. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because there would be no major adverse impacts to resources whose conservation is (1) necessary to fulfill specific purposes in the establishing legislation or proclamation for Walnut Canyon National Monument; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

The No-Action Alternative would result in moderate adverse impacts to visitor experience by continuing to limit access to the full range of park resources, including the opportunity to visit prehistoric sites other than cliff dwellings. Visitors with disabilities would experience major adverse impacts caused by continued inaccessibility of most structures and other resources related to park

significance. Some visitors would experience minor to moderate adverse impacts from the lack of opportunity to explore beyond the limited developed area now available for public use.

Alternative 1 would result in moderate adverse impacts to several aspects of visitor experience during construction and remodeling of the existing developed area, but these would be short term. There would be minor to moderate impacts to personal freedoms and traditional recreational activities because of zoning of newly acquired lands and removal of some uses from the park. These impacts would be partially mitigated by increased on-site information on regional recreational opportunities.

Alternative 2 would result in major adverse impacts to several aspects of visitor experience during construction and remodeling in the existing developed area, but these would be short term. This alternative would consider reservation and/or shuttle systems if necessary to control visitation numbers. Moderate adverse impacts on personal freedoms could result if such systems were implemented.

PARK NEIGHBORS; LOCAL, STATE, AND TRIBAL LAND MANAGEMENT PLANS; AND LAND/RESOURCE MANAGING AGENCIES

Methodology

Impact topics were identified through the scoping process, and concerns covered by this section include effects on neighbors' access and emergency response, economic contribution of park to local economies, access to

culturally sensitive areas by traditional users, traditional land uses external to the boundary, and possible conflicts between the proposed action and local, state, or Indian tribal land use plans, policies, or controls. Levels of intensity of impacts on park neighbors are as follows.

Negligible: The impact is barely detectable and/or will affect few neighbors.

Minor: The impact is slight, but detectable, and/or will affect a minority of neighbors.

Moderate: The impact is readily apparent and/or will affect many neighbors.

Major: The impact is severely adverse or exceptionally beneficial and/or will affect the majority of neighbors.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Most impacts resulting from this alternative would be of a beneficial nature to NPS neighbors, American Indian tribes, and other land and resource managers.

Cooperative efforts with the USFS have beneficial, moderate, long-term impacts on their resource management programs in the area in terms of interpretation, recreational uses, and resource management. Cooperative law enforcement activities provide moderate, long-term beneficial impacts to the USFS. The NPS is available to respond to wildfire situations in the immediate area, pending the availability of USFS personnel, resulting in moderate, long-term, beneficial impacts.

Cooperative efforts with the Arizona Game and Fish Department are focused on preserving wildlife and habitat, which results in minor, long-term, adverse impact to that agency in terms of wildlife management workloads. However, there are moderate, long-term benefits in their maintaining healthy and diverse wildlife populations.

The alternative accommodates American Indian access to traditional cultural resources within the monument, resulting in moderate, long-term, beneficial impacts to those users. There may be occasions when they experience minor, short-term adverse impacts resulting from congestion (traffic and public use) during busy visitor periods.

The Forest Service is involved in an amendment to the USFS Forest Plan for a large area adjacent to the Flagstaff National Monuments. The Flagstaff Lake Mary Ecosystem Analysis (FLEA) addresses recreational opportunities, access, roads, off-highway vehicles, trails, forest health, camping, groups uses, special events, outfitter/guides, minerals withdrawals, snow play sites, motocross and commercial uses. The National Park Service is a participant in this planning activity and will represent concerns that arise from proposals affecting areas near the monuments. The National Park Service recommendations for the FLEA could result in minor, short-term impacts to Forest Service administrative and writing workloads. National Park Service input would be directed at resource preservation, land and resource uses, and appropriate visitor uses and recreational activities that do not result in adverse impacts to the monuments. Such input could result in moderate, long-term impacts to the

ENVIRONMENTAL CONSEQUENCES

Forest Service in relative to FLEA elements that could address protection of park resources, vistas and natural sounds.

The monument is a component of the Flagstaff Open Spaces and Greenways Plan, and thus provides a moderate, long-term, beneficial impact to the city by providing desirable "park-like" environments adjacent to the urban development.

The entrance road is open 24 hours a day and provides a moderate, long-term, beneficial impact to neighbors who use it for access to USFS lands adjacent to the monument.

Accommodating access to lands on the west side of the monument would have minor to moderate, short- and long-term, and both beneficial and adverse impacts on neighbors in terms of modified access and intrusions during work periods.

Occasionally, visitors are directed to USFS areas to pursue recreational activities not allowed in the monument, but provided for in nearby locations. This could result in minor, short-term adverse impacts to Forest Service workloads in terms of visitor use management activities.

Climbing activities that have occurred in the new lands on the west boundary would be redirected to other areas on the National Forest. This restriction would have minor, long-term, adverse impacts to a very few individuals.

The relocation of climbing activities out of the monument and onto USFS lands could have minor, long-term impacts through increased workloads involved with managing and monitoring this activity.

Existing conditions would have minor, but increasing and long-term, adverse

impacts to other land and resource management agencies in terms of administrative workloads, resulting from increased agency cooperation as the city continues to grow and visitation to and recreational demands on the monument and adjacent forests increase.

CUMULATIVE EFFECTS

The geographic area considered in this alternative includes the city of Flagstaff on the west, the Winona community on the east, Upper and Lower Lake Mary on the south, I-40 on the north, and the lands generally enclosed by these landmarks.

Changes in visitor and neighbor uses of the monument and growth and development of the city and surrounding areas would result in minor to moderate, short- and long-term adverse impacts to other land and resource managers (USFS, state, city, and Arizona Game and Fish) in terms of increased administrative workloads.

As the city continues to expand nearer the monument there could be moderate, long-term, adverse impacts on other agency staff providing law enforcement and resource protection.

There could be moderate, long-term adverse impacts to the neighboring public who could lose recreational opportunities in lands adjacent to the monument as development encroaches and precludes existing recreational opportunities.

The combined effects of the actions by all land and resource management agencies would result in minor to moderate, short- and long-term, adverse impacts to one another and to park neighbors. The contribution to these impacts resulting from implementing the NPS No-Action

Alternative would be minor, primarily a result of changes in visitor and neighbor use areas and activities.

CONCLUSION

Within existing conditions, the management actions of the NPS would provide many beneficial impacts to other agencies, neighbors, and American Indian tribes in terms of cooperative resources management, planning, and visitor uses. Existing conditions would result in only minor impacts to the workload of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning/management efforts.

Growth and development of the city of Flagstaff would create moderate, long-term, adverse impacts to other land and resource managers and neighbors, in terms of additional workloads and loss of recreational areas and opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

The Forest Service planning (FLEA) implications would be the same as they are under the No-Action Alternative.

Park neighbors who currently recreate adjacent to and within the west boundary of the monument would experience moderate, long-term beneficial impacts by having enhanced access to monument features, but through controlled entry points. The new lands on the west side of the monument would be available for residential neighbor uses

and would be reached from the Arizona Trail that runs near the northwest corner of the monument.

Most existing roads in this area of the monument would be eradicated. Some would be converted to trails for hiking, mountain bike, and horseback access, which would have moderate, long-term, adverse impacts on those neighbors who have traditionally entered this area by motorized vehicle. However, this action would result in moderate, long-term, beneficial impacts to those neighbors who enter by foot, bicycle, or on horseback. There would be minor, short-term, adverse impacts to some neighbors as natural sounds and vistas are disturbed during actual eradication of roads and trail development activities. There would, likewise, be minor, short-term, adverse impacts to neighborhood recreational users during these work periods, as their access would be restricted at times.

Improvement of the road along the north rim could create interruptions to wildlife movement resulting from increased vehicle traffic. This would require consultation and interaction with the Arizona Game and Fish Department relative to mitigating impacts to wildlife and corridors and would result in minor, intermittent, adverse impacts that would increase wildlife monitoring workloads.

Climbing activities would be redirected out of the monument, as in the No-Action Alternative.

Changes in visitor activities and use areas could result in minor, long-term, adverse impacts to American Indian tribes, because they could experience increased contacts with visitors during traditional uses of areas of the monument. Other implications to

American Indian traditional uses would be the same as under the No-Action Alternative.

Additional visitor uses and opportunities in the monument and adjacent area could result in extended stays in the community, which, in turn, could result in moderate, long-term, beneficial impacts to Flagstaff in terms of increased revenues from lodging, dining, and related services.

The development of a new orientation area near I-40, and the relocation of administrative facilities would have minor, short term, adverse impacts on neighbors resulting from construction activities (dust, noise, traffic delays).

CUMULATIVE EFFECTS

The geographic area considered in this alternative are the same as in the No-Action Alternative

The growing population of Flagstaff will increase pressure on the USFS and State of Arizona to provide for recreational opportunities for residents. NPS actions, in combination with these other actions, would result in minor to moderate, short- and long-term impacts to other land and resource managers by requiring a commitment of time, funds, and personnel to plan and implement new management strategies in response to changing demands on recreational resources.

Changes in access to lands on the west side of the monument would have minor to moderate, short- and long-term, and both beneficial and adverse impacts to neighbors in terms of modified access and intrusions during work periods.

Neighbors participating in climbing activities in the monument would experience minor, long-term, adverse

impacts with the relocation of that recreational area.

A local rancher would experience a minor, long-term, adverse impact in the loss of a very small portion of grazing land to a fenced roadway along the north rim of the canyon.

Changes in visitor and neighbor uses of the monument and growth and development of the city and surrounding areas would result in minor to moderate, short- and long-term adverse impacts to other land and resource managers (USFS, state, city, and Arizona Game and Fish) in terms of increased administrative workloads.

American Indian uses would be accommodated as described under the No-Action Alternative.

The combined effects of the actions by all land and resource management agencies would result in major impacts to one another, and to park neighbors. The contribution to these impacts from proposed NPS actions would be minor, primarily resulting from changes in visitor and neighbor use areas and activities.

CONCLUSION

Management actions in this alternative would provide benefits to other agencies, neighbors, and American Indian tribes in terms of cooperative resources management, planning, visitor uses, and access to traditional cultural resources. There would be only minor impacts to the workload of others in terms of additional administrative tasks, interpretive planning, agreement reviews, and joint planning/management efforts.

Growth and development of the city of Flagstaff would create moderate, long-term, adverse impacts to other

land and resource managers and neighbors, in terms of additional workloads and loss of recreational areas and opportunities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

The Forest Service planning (FLEA) implications and implications of the growth of the city of Flagstaff would be the same as identified for the No-Action Alternative.

There would be major, long-term impacts to park neighbors who currently enjoy recreational opportunities within the new lands added through the 1996 boundary expansion. This alternative would eliminate public uses in this area, which could result in moderate, long-term impacts to the Forest Service as public uses increase on lands adjacent to the monument. Administrative workloads and resource management actions could increase in response to these increased recreational activities.

The location of a new visitor center near I-40 could have a beneficial, moderate, long-term impact to other land managers, because they could have the opportunity to share their agency messages from this facility. Minor short-term impacts to those agencies' administrative workloads could occur during the preparation of interpretive messages for the public.

The entrance road would be gated during closed hours near I-40, and on each side of F303. This would have a minor, long-term impact to local neighbors who have used this road

for after-hours access to USFS areas; they would be restricted to FR303, which would remain open 24 hours a day and provide reasonable access to the national forest along the north boundary of the monument.

The improved road to the parking area for the First Fort trail would have minimal long-term adverse impacts to the grazing permittee. There would be increased seasonal (summer) visitor traffic and increased contacts with monument users, but the change would create no loss in grazing area.

The new interpretive trail to First Fort could create barriers to wildlife movement and result in moderate long-term impacts to the Arizona Game and Fish Department. That agency would have increased administrative workloads in animal management and monitoring.

Climbing activities would be redirected out of the monument as in Alternative 1.

The implications to American Indian traditional uses would be the same as those identified for the No-Action Alternative.

CUMULATIVE EFFECTS

The geographic area considered in this alternative is the same as in the No-Action Alternative.

A new visitor center could have minor to moderate short- and long-term impacts on other land managers, by providing an opportunity for them to share their information with the visiting public, but requiring the commitment of resources to prepare the informational messages and media.

Some neighbors would experience a minor long-term adverse impact,

because they would lose use of the entrance road during closed hours.

The loss of access to the new lands on the west side of the monument would have moderate long-term adverse impacts to those neighbors who have traditionally used that area for recreational activities. The loss could be replaced in other areas of the National Forest, resulting in minor long-term adverse impacts to Forest Service administrative and management workloads.

A local rancher would experience a minor long-term adverse impact, resulting from increased contacts with monument visitors during busy seasons.

Changes in visitor and neighbor uses of the monument and growth and development of the city and surrounding areas would result in minor to moderate short- and long-term adverse impacts to other land and resource managers (USFS, state, city, and Arizona Game and Fish) in terms of increased administrative workloads.

The implication to American Indians would be the same as identified for the No-Action Alternative.

The combined effects of the actions by all land and resource management agencies would result in minor to moderate impacts to one another, and to park neighbors. The contribution to these impacts from proposed NPS actions would be minor, primarily resulting from changes in visitor and neighbor use areas and activities.

CONCLUSION

The loss of access to new lands on the west side of the monument would create moderate long-term adverse

impacts to traditional neighborhood uses of that area.

The elimination and relocation of the climbing area in the monument would have minor long-term adverse impacts to a very few individuals. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible or irretrievable commitments of resources.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

Under the No-Action Alternative, cooperative efforts with the Arizona Game and Fish Department are focused on preserving wildlife and habitat, which results in minor long-term adverse impact to that agency in terms of wildlife management workloads. Existing conditions would have minor, but increasing and long-term, adverse impacts to other land and resource management agencies in terms of administrative workloads, resulting from increased cooperation as the city continues to grow, and visitation and recreational demands on the monument and adjacent forests increase. As the city continues to grow nearer the monument there could be moderate long-term impacts

on other agency staff providing law enforcement and resource protection. There could be major long-term impacts to the neighboring public who could lose recreational opportunities in lands adjacent to the monument as development encroaches.

Under Alternative 1, most existing roads in the newly acquired area of the monument would be eradicated. Some would be converted to trails for hiking, mountain bikes, and horseback riding, which would have moderate long-term adverse impacts on those neighbors who have traditionally traveled this area by motorized vehicle. There would be minor short-term adverse impacts to some neighbors as natural sounds and vistas are disturbed during eradication and improvement activities. There would, likewise, be minor short-term adverse impacts to neighborhood recreational users during these work periods. Increased visitor use along the north rim of the canyon to First Fort could be a minor long-term adverse impact to a neighboring rancher, because fencing of the road would result in a very slight reduction in the permitted area. This action could also create a minor intermittent adverse impact on the USFS, and there would be a slight increase in their administrative workload in terms of negotiating with the permittee. Improvement of the north rim scenic drive could create interruptions to wildlife movement, resulting from increased vehicle traffic. This would require consultation and interaction with the Arizona Game and Fish Department relative to mitigating impacts to wildlife and corridors and would result in minor intermittent adverse impacts that would increase wildlife monitoring workloads. The relocation of climbing activities out of

the monument and onto USFS lands could have minor long-term impacts in the form of increased workloads required for managing and monitoring this activity. Changes in visitor activities and use areas could result in minor long-term adverse impacts to American Indian tribes, because they could experience increased contacts with visitors during traditional uses of areas of the monument.

The USFS is involved in a major planning effort for this area through the Flagstaff Lake Mary Ecosystem Analysis. In that plan, they are considering some reduction in roads, increased monitoring activities, forest closures/restrictions, and forest restoration activities. The increasing population of Flagstaff would increase pressure on the USFS and the State of Arizona to provide for recreational opportunities for these nearby residents.

In Alternative 2, NPS proposed actions, in combination with these other actions, would result in minor to moderate, short- and long-term impacts to other land and resource managers, by requiring a commitment of time, funds, and personnel to plan and implement new management strategies in response to changing demands on recreational resources.

There would be major, long-term impacts to park neighbors who currently enjoy recreational opportunities within the new lands added through the 1996 boundary expansion. Alternative 2 would eliminate public uses in this area, which could result in moderate long-term impacts to the Forest Service as public uses increase on lands adjacent to the monument. Administrative workloads and resource management

actions could increase in response to these increased recreational activities.

The entrance road would be gated during closed hours; fees would be collected near I-40 during hours of operation. This would have a minor long-term impact to local neighbors who have used this road for access to forest areas. FR303 would remain open and still provide reasonable access to the national forest along the north boundary of the monument. An improved road to the parking area for the First Fort trail would have minimal long-term adverse impacts to the grazing permittee. There would be increased seasonal (summer) visitor traffic and increased contacts with monument users, but the change would create no loss in grazing area.

The new interpretive trail to First Fort could create barriers to wildlife movement and result in moderate long-term impacts to the Arizona Game and Fish Department. That agency would have increased administrative workloads in animal management and monitoring. The relocation of climbing activities out of the monument and onto USFS lands could have minor long-term impacts through increased workloads involved with managing and monitoring this activity. Changes in visitor activities and use areas could result in minor long-term adverse impacts to American Indian tribes, because they could experience increased contacts with visitors during traditional uses of areas of the monument.

OPERATIONAL EFFICIENCY

Methodology

Operational efficiency, for the purpose of this analysis, refers to adequacy of the staffing levels and quality and effectiveness of the

infrastructure used in the operation of the park in order to adequately protect and preserve vital park resources and provide for an effective visitor experience. This includes an analysis of existing and needed staffing levels and of the condition and usefulness of the facilities and developed features used to support the operations of the park. Facilities include the roads that are used to provide access to and within the park (both administrative and visitor use), housing used for staff required to work and live in the park, visitor orientation facilities (visitor centers, developed and interpreted sites, and other interpretive features), and the necessary administrative buildings (office and workspace for park staff), garages, shops, storage buildings, and yards used to house and store the equipment, tools, and materials used to maintain the constructed facilities and features that support the operations of the park. This also includes the presence of utilities such as phones, sewer, water, and electric and other constructed features used to facilitate the operations of the parks.

In addition to the above, discussion of impacts to park operations focuses on (1) employee and visitor health and safety, (2) ability to protect and preserve resources, (3) staff size, whether staffing needs to be increased or decreased, (4) existing and needed facilities, (5) communication (i.e., telephones, radio, computers, etc.), and (6) appropriate utilities (sewer, electric, water). Park staff knowledge was used to evaluate the impacts of each alternative and is based on the current description of park operations presented in the Affected Environment section of this document. Definitions for levels of

impacts to operational efficiency are as follows:

Negligible: Changes would be so small that it would not be of any measurable or perceptible consequence.

Minor: Changes would be small and, if measurable, the consequences would be small and localized.

Moderate: Changes would be measurable and would have a consequence.

Major: Changes would be measurable and would have substantial consequences.

Effects of the No-Action Alternative: Existing Conditions

IMPACT ANALYSIS

Under the No-Action Alternative operational efficiency would continue in approximately the same manner as it currently exists.

The installation of new wayside and museum exhibits would have long-term impacts that would moderately change operational efficiency in a beneficial manner. Interpretation presented to the visiting public would afford a higher level of awareness of the significance of the resources in the park, and information would be provided regarding use and access restrictions. This in turn would increase the level of protection afforded park resources and reduce the need for law enforcement patrols.

Increasing accessibility of facilities and natural and cultural features would have a negligible to minor impact on to operational efficiency. The impact would be beneficial and long term. It would result in the development of the appropriate infrastructure that

would make available certain areas of the park that are currently inaccessible to visitors with disabilities.

Addressing the existing health and safety issues is likely to have a moderate to major, beneficial impact on operational efficiency. Many of the existing deficiencies and health and safety needs in the other facilities in the park would be addressed and mitigated.

The designation of Mexican spotted owl critical habitat would not have a notable impact on operational efficiency. Since the backcountry of Walnut Canyon is closed to unguided visitor use there would be no impact as a result of visitor use. There would, however, be a long-term commitment to monitor and maintain the habitat and conduct consultations with U.S. Fish and Wildlife Service. This would marginally increase the workload for resources management staff.

The existing inholding would not have an impact to operational efficiency as long as the existing use of the land does not change. The owner has expressed an interest in developing this property. Any efforts of development would have minor to moderate long-term adverse impacts to operational efficiency. Increased law enforcement patrols would be needed as a result of exposure of park resources to trespass and inappropriate uses. A substantial short-term effort would have to be made to determine the most effective way to protect and eliminate impacts to significant natural and cultural resources. This would have a minor to moderate adverse impact on operational efficiency.

The existing backcountry of Walnut Canyon has never been open to

unguided use. Since this alternative would continue this situation there would be no impact to operational efficiency. Additional backcountry closure areas, which are closed to unguided use, may be designated in the 1996 expansion lands once boundary surveys and resource inventories have been completed. Since a number of management activities are already being carried out on the expansion lands, this action would have a negligible long-term adverse impact on operational efficiency. Formalization of the prescribed management use of the backcountry would have a minor, short-term impact on operational efficiency due to the need to increase staff presence in order to effectively implement any change in use of the new lands. This would mostly consist of making contact with users of the area who are unaware that the ownership, use, and access to the area have changed. This impact would be mitigated as the public becomes familiar with the change.

Roadways and Access

Under the No-Action Alternative, Walnut Canyon would continue to be accessed via I-40 and the three-mile-long entrance road. Additional visitor access would be via FR303, approximately 1/2 mile north of the entrance station. This would have a negligible to minor impact on park operations. Visitors and staff would continue to be exposed to steep and narrow shoulders, with few places to pull off safely in the event of an emergency, and to the risk of hitting large game. There is potential for this situation to increase given the likely growth of the city of Flagstaff and the surrounding areas and the number of visitors likely to visit the Flagstaff area and the scenic destination points in

the Northern Arizona and Four Corners regions.

There would be minor to moderate impacts on park operations with the continued use of FR303. It is likely that there would be an increase in both visitor and commuter traffic, resulting in increased accidents.

Continued use of FR128 and FR128c would have a minor to moderate impact on operational efficiency. Given the current inability to physically close any of the roads that provide access up to park boundaries, an increase in use of the associated roads would compound the difficulties that already exist in protecting park resources. This includes entry into areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources. There would be an increased demand on staff to accomplish patrols and to provide 24-hour emergency response.

Visitor Use

Under the No-Action Alternative, visitor use of the park would continue as it exists currently, which would have a negligible, long-term impact on park operations. Park operations currently work reasonably well, because most visitor uses are concentrated at the visitor center. There would be continued inability to provide immediate contact when visitors enter the park, and there would still be no staff present to provide orientation at any of the developed sites. Visitors to these developed areas would continue to be exposed to climatic extremes, poisonous wildlife, and uneven surfaces in and around interpreted features.

Facilities

Implementation of the No-Action Alternative would have a minor to moderate, long-term adverse impact on park facilities. The existing visitor center would remain inadequate and obsolete. Although some improvements would be made, it would still be in need of major upgrading and remodeling.

The existing parking lot would continue to be insufficient to handle the visitor demand. Conflicts would continue to exist between pedestrians and vehicles.

Many of the existing deficiencies and health and safety needs in other facilities would remain, and worsen if not addressed.

Utilities

The No-Action Alternative would have a minor to moderate, long-term adverse impact on the utilities in the park. Without improvements, the park would continue to be subjected to repeated brown- and blackouts. Overall, this would have a constant and long-term adverse impact on the ability to conduct business and the quality of life of the employees that reside in the park.

Staffing

Implementation of the No-Action Alternative would have a minor to moderate long-term adverse impact on staffing within the park. Existing staff levels are deficient, and there are serious limitations on the park's ability to provide adequate and acceptable levels of visitor services, resource protection and preservation, and maintenance of facilities.

CUMULATIVE EFFECTS

The geographic area of consideration in this alternative includes the city of

Flagstaff on the west, I-40 on the north, FR128 on the east, and Anderson Mesa on the south.

Growth and development of the city of Flagstaff and the outlying communities would have a minor to moderate long-term effect on operational efficiency. The most significant effect would be an increase in the number of visitors coming to the park. Increased growth would also mean that commuter traffic from the outlying communities, such as Cosnino or Winona, would increase, resulting in an increase in the need for law enforcement patrols and emergency response.

Increased growth of the surrounding communities would increase the interest and demand to access USFS land surrounding the park. Such use could result in unauthorized entry to closed areas of the park, with possible intentional and unintentional impacts to park resources. This could have minor to moderate long-term impacts on operational efficiency, resulting in an increased need for law enforcement patrols to protect to protect park resources.

The USFS is considering increasing use and access regulation, including the closure of a number of nonessential roads, regulation of off-road driving, and the development of definable trail systems. Implementation of these actions would reduce the need for NPS patrols along park boundaries for resources protection purposes. If the use of these areas were to increase, there would also likely be a need to provide 24-hour emergency response. The effect of these actions would long term and adverse, but the impacts would be minor.

Partnerships and ongoing regional planning efforts have the potential to

mitigate the impacts described above. The city of Flagstaff, U.S. Forest Service, State of Arizona and Coconino County are currently initiating planning efforts that should facilitate the protection and preservation of lands adjoining the park. The results of these efforts would be long term and beneficial.

CONCLUSION

The No-Action Alternative would result in no substantial change in the operations of the park. The effects of implementing the No-Action Alternative would be minor to moderate. Most of the major roads providing access to the park would likely see an increase in visitor and commuter traffic, which would result in additional congestion and a likely increase in accidents. Maintenance needs would increase. Increased use of all roads leading to the park would compound the difficulties that already exist in protecting park resources, including entry to areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources.

The effects to facilities, utilities, and staffing would be minor to moderate. Without improvement to the facilities or utilities, conditions would worsen. Limitations on current staff levels inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Effects of Alternative 1: Diversify Opportunities for Visitor Use

IMPACT ANALYSIS

The impacts resulting from the installation of new waysides and museum exhibits, increasing the park's ability to accommodate visitors with disabilities, addressing health and safety issues, designating of critical habitat, managing the park's inholding, and developing management use determinations on the new lands would all be the same as those described for the No-Action Alternative.

Additional impacts to operational efficiency that would occur with the implementation of this alternative include the following:

Roadways and Access to the Park

The entrance road would continue to be used as it is used now, and many of the associated issues and concerns would continue to exist. This should have a negligible to minor, adverse impact on operational efficiency. There would be two changes, however, that would dramatically improve how the public moves through the park. These changes would be moderately beneficial to operational efficiency. They include the following: a new orientation facility that would be constructed at the park entrance at I-40 and would include a pullout and/or turnaround for vehicles towing trailers, and relocation of the existing visitor center parking lot (except for handicapped and administrative parking) to an area southeast of the intersection of FR303 and the entrance road.

For both actions there would be major, short-term adverse actions requiring extensive compliance and mitigation. There would be substantial initial costs for construction of the parking area, and additional long-term maintenance would be required.

A new scenic drive would be developed along the north rim, using an existing USFS road, to provide additional views of the canyon and the First Fort area, and opportunities to view wildlife and experience the environment. Initially, this unpaved road would be maintained in a semi-primitive condition for seasonal use, and park staff would be required to escort visitors. However, the road could be substantially upgraded in the future. There would be major, short-term actions requiring extensive compliance and mitigation. There would be substantial initial costs for engineering and construction of the road and parking area at First Fort and long-term maintenance requirements. Additional staff and equipment would be required to provide for visitor use and education and to meet maintenance needs. This would have a minor to moderate long-term adverse impact on operational efficiency.

Hiking, bicycling, horseback riding, and guided hikes would occur on existing roads and trails on the rim in the newly acquired lands in the western part of the monument. Climbing activities would be discontinued. Providing controlled access to the new lands would include the initial costs associated with established trailheads and improved trails. This would have a short-term moderate adverse impact on operational efficiency. Long-term funding and staff would be required

to facilitate visitor use, provide educational opportunities, and respond to increased maintenance requirements. This would have a minor to moderate adverse impact on operational efficiency. Guided hikes to the First Fort area on the extreme east side of the park would result in similar impacts to operational efficiency.

All areas of the south rim would be closed to visitor use. FR128c would be gated at the park boundary and used for administrative purposes only. The impact to operational efficiency would be no greater than what currently exists. However, changes in land use policy could require increased law enforcement patrols, which would have a minor, long-term adverse impact on operational efficiency.

Visitor Use

New wayside exhibits would be placed on the entrance road near I-40 to provide visitors with an overview of the monument prior to their reaching the resources. Wayside exhibits would require design and placement in a newly constructed traffic pullout. Ground disturbances would necessitate compliance actions and consultation with the Arizona State Historic Preservation Officer and affiliated tribes. Staff time would be needed to mitigate impacts to cultural and natural resources. There would be short-term requirements of staff in design, construction, and mitigation, and there would be long-term requirements for maintenance of the waysides and for keeping the wayside information current. This would have a negligible adverse impact on operational efficiency.

Facilities

Administrative offices in the existing visitor center would be relocated to new facilities at the intersection of the entrance road with FR303. The existing parking lot would be retained to accommodate the requirements of visitors with disabilities. A new parking area would be constructed a few hundred feet to the north. These would be major actions requiring substantial construction, compliance, and mitigation of impacts to cultural and natural resources. All this would result in some short-term inconveniences to staff. There would be substantial initial costs for construction and long-term costs associated with maintenance requirements.

Existing housing and maintenance areas would be retained. Moderate, long-term beneficial impacts of this action would result from removing the majority of vehicle traffic from the rim of the canyon and converting the existing visitor center/administrative offices into a facility that could accommodate expanded visitor service activities and programs. This building would require extensive modification to accommodate wheelchair users and visitors with other disabilities.

Staffing

The actions of this alternative would have minor to major impacts on the staffing component of operational efficiency.

There would be an increase in ranger-conducted visitor uses on the north rim in areas east and immediately west of the visitor center. These actions would require initial inventory and ongoing monitoring of cultural and natural resources and the designation of specific areas to be

available for expanded visitor uses. There would be a long-term need for increased staff to provide for this dispersal of visitor use; however, access into new areas would alleviate crowded conditions on the Island and Rim Trails.

Administrative needs would be increased, including purchasing and contracting for supplies, materials, and services, especially during the time when construction is ongoing. This would have a major, short-term adverse impact on operational efficiency.

Maintenance staff would have increased workloads on roads, trails, and facilities, including the maintenance of a new trail and visitor center. They would continue to work in less than desirable maintenance facilities, which would have a long-term, moderate adverse impact on operational efficiency.

As a result of the proposed new construction, resources staff would have increased workloads associated with consultation, compliance, and clearance of the proposed construction locations. This would have a major, short-term adverse impact on operational efficiency. Minor long-term adverse impacts would occur as a result of resource monitoring and preservation requirements associated with the increased visitor use of the new hiking areas. Operational efficiency would benefit by having adequate office and workspace.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under this alternative would be similar to the No-Action Alternative.

CONCLUSION

Implementation of Alternative 1 would have a long-term beneficial impact on operational efficiency. There would be major, short-term impacts resulting from the construction of a new visitor center and parking lot, rehabilitation of the old visitor center, construction associated with the road to First Fort, and access and trail improvements necessary for the increased visitor uses on the western and eastern portions of the park. However, following construction, there would remain only minor to moderate impacts on operational efficiency. Most impacts would be in the form of increased maintenance needs for facilities and trail systems and increased resource protection and preservation needs. This alternative would not fully address the inadequacies with the existing visitor center and parking lot; however, it should improve the work environment for the park staff. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because the identified major adverse impacts are to operational efficiency rather than to a resource or value whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Walnut Canyon National Monument; 2) key to the natural or cultural integrity of the park or to the opportunity for enjoyment of the park; or 3) identified as a goal in relevant NPS planning documents, there would be no impairment of the park's resources or values.

Effects of Alternative 2 (Preferred): Emphasize Preservation

IMPACT ANALYSIS

The impacts resulting from the installation of new waysides and museum exhibits, increasing the park's ability to accommodate visitors with disabilities, addressing health and safety issues, designating of critical habitat, managing the park's inholding, and developing management use determinations on the new lands, would all be the same as described for the No-Action Alternative.

Additional impacts to operational efficiency that would occur with the implementation of this alternative include the following:

Roadways and Access to the Park

The entrance road would continue to be used as it is used now, and many of the associated issues and concerns would continue to exist. This should have a negligible to minor adverse impact on operational efficiency.

A new fully accessible visitor center and parking area would be constructed near I-40 and the entrance road. The entrance road would be gated and locked during the night at this location and at the intersection of FR303. FR303 would remain open for visitor and local use. An additional gate would be located just beyond FR303 and the entrance road to eliminate after-hours entry into the park. This would have a minor to moderate, long-term beneficial impact on operational efficiency. It would eliminate unauthorized use of the entrance road and the park and would reduce

the need for law enforcement patrols and 24-hour emergency response. Many of the issues associated with the parking area and the visitor center would be eliminated by the construction of the parking area near I-40. This would have a moderate, long-term beneficial impact on operational efficiency. As a result of the proposed construction, there would be major, short-term adverse actions requiring extensive compliance and mitigation. There would be substantial initial costs for construction of the parking area and long-term maintenance requirements, which would have a minor impact on operational efficiency.

Facilities

A new visitor center with offices and associated parking lot would be constructed at the intersection of I-40 and the entrance road. The modern additions to the existing visitor center would be removed and the facility would be restored to its historic appearance. The remaining portion of the visitor center would be retained for visitor orientation and education purposes. This would have a long-term, moderately beneficial impact on operational efficiency. There would be major actions associated with facility construction, including compliance and mitigation of impacts to natural and cultural resources. There would be substantial initial costs for construction and long-term costs associated with maintenance. Following construction and rehabilitation of the visitor centers, there would be only a negligible to minor adverse impact on operational efficiency.

Existing housing and maintenance facilities would be retained, which would have a negligible, adverse impact on operational efficiency.

Visitor Use

Self-guided and ranger-led trails would be unchanged. All new lands within the recent boundary expansion would be closed to all entry. Visitor use in the vicinity, including hiking, biking, and horseback riding, would be restricted to the Arizona Trail and adjacent USFS lands. FR128c would be gated at the park boundary and used for administrative purposes only. The impact to operational efficiency would be no greater than what currently exists. However, changes in land use policy could require increased law enforcement patrols, which would have a minor, long-term adverse impact on operational efficiency.

An existing undesignated USFS road would be used for access to the eastern portion of the monument, including guided hikes into the bottom of Walnut Canyon. This would have minor to moderate, long-term adverse impact on operational efficiency. Initial costs would be required for establishment of trailheads and road improvements. Long-term costs would include those for law enforcement patrols for resource protection and those for road maintenance.

Staffing

The actions of this alternative would have minor to major impacts on the staffing component of operational efficiency.

There would be an increase in ranger-conducted visitor uses on the north rim in areas east and west of the visitor center. These actions would require initial inventory and ongoing monitoring of cultural and natural resources. There would be a long-term need for an increase in staff to accommodate this dispersal of visitor

use; however, use of new areas would alleviate crowded conditions on the Island and Rim Trails.

Administrative needs would be increased, including the purchasing and contracting for supplies, materials, and services, especially during construction periods. This would have a major, short-term impact on operational efficiency.

Maintenance staff would have increased workloads on roads, trails, and facilities. They would continue to work in less than desirable maintenance facilities, which would have a long-term, moderate adverse impact on operational efficiency.

As a result of the proposed new construction, resources management staff would have increased workloads associated with consultation, compliance, and clearance of the proposed construction locations. This would have a major, short-term adverse impact on operational efficiency. Minor long-term adverse impacts would occur as a result of resource monitoring and preservation requirements associated with the increased visitor use of the new trails.

CUMULATIVE EFFECTS

Cumulative effects to operational efficiency under this alternative would be similar to those identified for the No-Action Alternative.

CONCLUSION

This alternative would have a long-term beneficial effect on operational efficiency. There would be major, short-term adverse impacts resulting from the proposed construction of a new administrative building and parking lot, and existing visitor center rehabilitation. However, following construction and rehabilitation, there would be only minor to moderate

adverse impacts on operational efficiency. Most impacts would occur in the form of increased maintenance requirements for facilities. In addition to those mentioned, there would be other, less severe effects as a result of implementing this alternative.

Because the identified major adverse impacts are to operational efficiency rather than to a resource or value whose conservation is 1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Walnut Canyon National Monument; 2) key to the natural or cultural integrity of the park or to the opportunity for enjoyment of the park; or 3) identified as a goal in relevant NPS planning documents, there would be no impairment of the park's resources or values.

Irreversible/Irretrievable Commitments of Resources

There would be no irreversible/irretrievable commitments of resources.

Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There would be no short-term gains affecting long-term productivity.

Unavoidable Adverse Impacts

Under the No-Action Alternative, most of the major roads providing access to the park would realize a likely increase in visitor and commuter traffic, which would result in additional congestion and a likely increase in accidents, increasing

ENVIRONMENTAL CONSEQUENCES

maintenance needs. Increased use of all roads leading to the park would compound the difficulties that already exist in protecting park resources. This includes entry into areas of the park that are closed to visitation and intentional and unintentional damage to archeological resources. The effects to facilities, utilities, and staffing would be minor to moderately adverse. Without improvement to the facilities or utilities, existing conditions would worsen. Staffing limitations exist that inhibit the park's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services.

Under Alternative 1, there would be major, short-term adverse impacts, resulting from the construction of a new visitor center and parking lot, rehabilitation of the old visitor center and parking lot, construction

associated with a new road to First Fort, and trail improvements necessary for the increased visitor uses on the western and eastern portions of the park. However, following construction and rehabilitation, there would be only minor to moderate adverse impacts on operational efficiency. Most impacts would be in the form of increased maintenance needs for facilities and trail systems and increased resource protection and preservation needs.

Alternative 2 would have major, short-term impacts, resulting from the proposed construction of a new visitor center and parking lot, and existing visitor center rehabilitation. However, following construction and rehabilitation, there would be only minor to moderate adverse impacts on operational efficiency, most of which would be in the form of increased maintenance requirements.

CONSULTATION AND COORDINATION

HISTORY OF PUBLIC INVOLVEMENT

The notice of intent (NOI) to prepare this EIS was published in the Federal Register May 19, 1997. The NOI indicated availability of newsletter #1, from which comments were accepted until June 30, 1997. The first newsletter described purpose and significance statements for all three parks, as well as identifying preliminary issues. A second newsletter, released February 1998, detailed public response to the first newsletter, described final purpose and significance statements, and explained the preliminary range of management zones. A third newsletter, issued November 1998, described the range of preliminary alternatives developed for all three monuments. The fourth newsletter in May 1999 described the decision to prepare a plan concurrently with the Forest Service Flagstaff Lake Mary Ecosystem Area planning process. All comments received through June 1999 were considered in this EIS. The Purpose of and Need for the Plan, Need for the GMP, and Description of Scoping Process sections describe the issues and concerns raised and sort the responses into several categories.

AGENCIES CONSULTED

A number of meetings were held with staff from the U.S. Forest Service and Arizona Game and Fish Department. These meetings were held to discuss impacts that the alternatives might have on adjacent recreational activities and impacts to wildlife and their movement corridors and to try

to ensure that NPS planning would be in support/harmony with their agency planning efforts. Several of these conversations explored the possibility of joint or comanagement of resources and visitor uses.

In keeping with its mandates for tribal consultation, NPS consulted with many American Indian tribes throughout the planning process. Based on ethnographic research efforts and previous consultations conducted for the Flagstaff Area national monuments during the last several years, ten tribes were identified as having potential traditional associations with park lands and resources. They are the Havasupai Tribe, Hopi Tribe, Hualupai Tribe, Navajo Nation, San Juan Southern Paiute Tribe, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai Apache Nation, Yavapai-Prescott Tribe, and Zuni Tribe. All ten tribes were contacted by letter and telephone, inviting them to attend an introductory meeting in October 1997. Six of the ten tribes participated in the October meeting, and four participated in a December 1997 consultation meeting. As of February 1998 participating tribes included Hopi, Hualupai, Navajo, White Mountain Apache, Yavapai Apache, Yavapai-Prescott, and Zuni.

At the first two consultation meetings the tribes discussed the purpose and significance statements and agreed on language for the final statements. They also discussed tribal involvement in identifying culturally significant and sensitive resources as well as plans for participation throughout the planning process. Early in 1998 the Hopi, Navajo, and Zuni Tribes agreed

to conduct further NPS-sponsored research into tribal associations with park lands and identify particular sensitive resources and management concerns for the EIS. Representatives from three tribes attended the final tribal consultation meeting in August 1998 and assisted with the development of alternatives. Early in 1999 the Hopi Tribe and Navajo Nation submitted to NPS reports identifying culturally sensitive resources and specific recommendations for the GMP.

All ten tribes originally identified continued to receive newsletters and invitations to consultation meetings throughout the planning process. Tribal interests and concerns were fully considered in the planning process and in the development of alternatives in the GMP.

LIST OF RECIPIENTS

Federal Agencies

Advisory Council on Historic Preservation

Department of Agriculture

Animal Damage Control

Natural Resource and Conservation Service

Animal and Plant Health Inspection Service

Forest Service

Tonto NF

Prescott NF

USFS Regional Office

Kaibab NF

Coconino NF, Mormon Lake District

Coconino NF, Peaks District

Department of Interior

Fish and Wildlife Service

Arizona Ecological Services

Geological Survey

National Biological Survey

National Park Service

Canyon de Chelly NM

Glen Canyon NRA

Grand Canyon NP

Guadalupe Mountains NP

Hubbell Trading Post NHS

Montezuma Castle NM

Navajo NM

Organ Pipe Cactus NM

Petrified Forest NP

Pipe Springs NM

Rivers and Trails Conservation

Assistance, Intermountain

Support Office, Santa Fe

Southern Arizona Group

Tonto NM

Western Region

Department of the Army, Corps of Engineers

Department of Transportation,
Federal Highway Administration

Environmental Protection Agency

U.S. Postal Service

Indian Tribes

Havasupai Tribe

Hopi Tribe

Cultural Preservation Office

Water Rights Hydrologist

Hualapai Tribe

Navajo Nation

Bodaway/Gap Chapter

Cameron Chapter

Leupp Chapter

Tuba City Chapter

Department of Agriculture

Historic Preservation Department

Forest Section

Division of Economic

Development

Division of Natural Resources

Lands Department

Navajo Tribal Ranches

Pueblo of Zuni
Heritage Historic Preservation
San Juan Southern Paiute Tribe
Tonto Apache Tribe
White Mountain Apache Tribe
Yavapai Apache Tribe
Cultural Preservation
Yavapai Prescott Indian Tribe

State Government

Department of Environmental Quality
Forest Service
Department of Mines and Minerals
Department of Public Safety
Department of Transportation
Design Section
Parkways and Historic Scenic
Roads
Department of Water Resources
Game and Fish Department
Office of the Governor
State Historic Preservation Office
Arizona State Parks
State Land Department
Forestry Division
Urban Planning Division

Local Government

City of Flagstaff
Chamber of Commerce
City Council
Convention and Visitor Bureau
Fire Department
Police Department
Public Library
Unified Public Schools
Unified School District
Utilities
Visitor Center
Citizens Utilities

City of Sedona
Public Library
Coconino County
Attorney
Board of Supervisors
Department of Community
Development
Highway Department
Parks and Recreation
Sheriff's Department
Supervisors
Doney Park
Fire Department
Water
Kachina Village Fire Department
Mountaineer Fire Department
Northern Arizona Council of
Governments
Timberline-Fernwood Fire
Department
Organizations/Businesses
AandS Distributing
A.B.A.T.E.
A5 Adventures
Absolute Bikes
Access Fund
Affordable Housing Coalition
American Motorcyclist Association
Andy's Body Shop
Arizona 4WD Clubs
Arizona Archeological and Historical
Society
Arizona Bowhunters
Arizona Cattlemen's Association
Arizona Riparian Council
Arizona Rough Riders Four-Wheel
Drive Club
Arizona Snowbowl
Arizona Snowmobile Association

CONSULTATION/COORDINATION

Arizona State Association of 4WD Clubs

Arizona Wildlife Federation

Arizona-Southern California Rocky Mountain Elk Foundation

Ascend Arizona

Aspen Sports

B A S S

Babbitt Ranches (Coconino Plateau Natural Reserve Lands)

Babbitt's Backcountry Outfitters

Bellemont Baha'i School

Big Joes Cycles

Book Nest

Canyon Country Outfitters

CCOEH

Central Arizona Grotto

CO Bar Livestock, LTD

Coconino Sportsmen

Cocopai RC and D

Colorado Plateau Forum

Dames and Moore

Darmstadt Elementary School

DBA Hart Ranch

Diablo Trust

DNA Legal Services

Doney Area Plan Committee

Doney Park Interest Groups

Ducks Unlimited Inc.

Earthlight

ENSR Consulting and Engineering

Environmental Action Coalition

Federal Land Exchange Inc.

First United

Flagstaff Film Commission

Flagstaff Hiking Club

Flagstaff Jeep Tours

Flagstaff KOA

Flagstaff Medical Center

Flagstaff Mountain Guides

Flagstaff Riding Club

Flagstaff RV Sales

Flying Heart Barn

Forest Conservation Council

Forest Guardians

Friends of Walnut Canyon

Grand Canyon Trust

Grand Canyon Wildlands Council

Greater Arizona Bicycling Association

Hanks Trading Post

Hart Prairie

Hart Ranch

High Desert Investments

Hitchin' Post Stables

Horse Trails Coalition

IMFAM Associates

Kampground Owners' Association

Karan English

Keep Sedona Beautiful Environmental Quality Committee

Lake Mary Fishing Boat Rentals

Lockett Ranch Inc.

Loose Spoke

Lowell Observatory

Manterola Sheep Company

Maricopa Audubon

McCoy Motors

Michelback Ranch

Monte Vista Marine

Mormon Lake Lodge	Prescott Climbers Coalition
Morrison Brother's Ranch	Prescott College Environmental Center
Mountain Man Events	RMRS-Flagstaff
Mountain Mushers	Rough Country Bowhunters
Mountain Sports	Ruff's Sporting Goods
Mountain View Pediatrics	S.E.C.
Mountaintop Honey	Salt River Project
Museum of Northern Arizona	Sanderson Ford
NAHB	Sedona Westerners
National Parks and Conservation Association	Shapins Associates
Native Plant and Seed	Shriner's Club
Northern Arizona University	Sierra Club
Arizona Historic Commission	Grand Canyon Chapter
College of Engineering	Legal Defense Fund
Department of Anthropology	Plateau Group
Department of Geography	Sinagua Trading Post
Department of Geology	Single Track Mountain Bikes
High Altitude Sports Training Complex	Sky Ranch Development, Inc.
Outdoors	Smith Contracting, Inc.
School of Forestry	Southwest Center for Bio Diversity
Northern Arizona Association of Realtors	Southwest Forest Alliance
Northern Arizona Audubon Society	Southwest Information
Northern Arizona Cattle Growers	Southwest Parks and Monuments Association
Northern Arizona Flycasters	SWCA, Inc.
Northern Arizona Grotto	Tametic Committee
Northern Arizona Riding Club	Teton Mountain Bike Tours
Northern Arizona Trust Lands Inc.	The Arboretum at Flagstaff
Northland Yamaha-Kawasaki	The Edge
Peace Surplus Outdoor Store	The Game Plan
People for the West	The Nature Conservancy
Peterson Lumber Company	The Wilderness Society
Ponderosa Outdoor/Sled Dog Inn	The Wilson Foundation
Popular Outdoor Outfitters	Total Timber
Precision Pine and Timber	

CONSULTATION/COORDINATION

Trust for Public Land

University of Arizona College of
Agriculture

Vertical Relief Rock Gym

Voters of Flagstaff

Wildlife Society

Arizona Chapter

Arizona State University Chapter

Windmill Ranch

Individuals

There are more than 900 individuals to whom copies of the EIS were sent. A complete listing of these names is available from the Superintendent, Flagstaff Areas office, 6400 N. Hwy 89, Flagstaff, AZ 86004.